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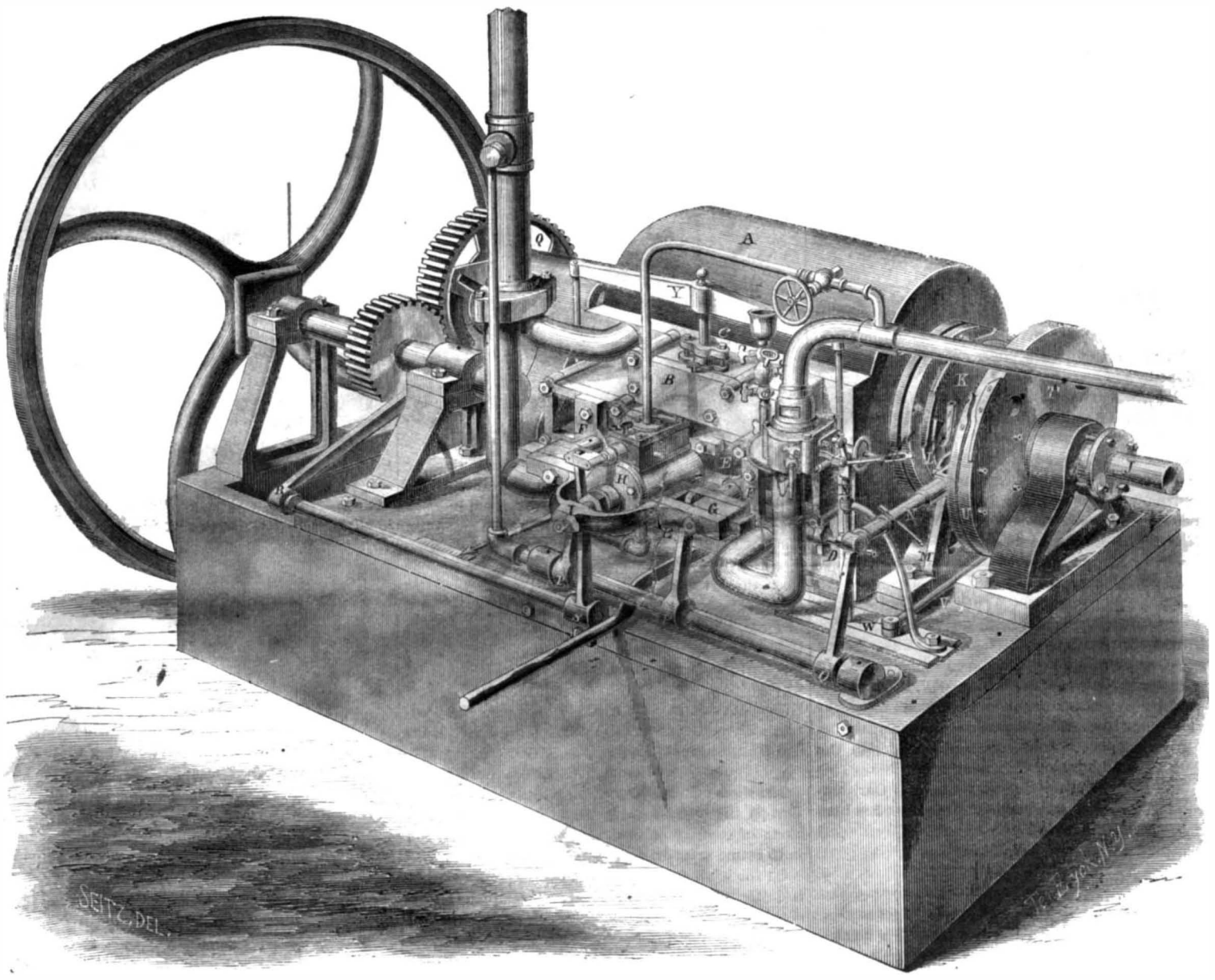

CHRISTENSEN'S PATENT ROTARY ENGINE.

We illustrate this week a rotary engine which is in most respects extremely novel. The object of the rotary engine, originally, was to produce a more simplified application of steam than was effected by other patterns. The inventor of this engine seems to have taken another view of the subject; he has enlarged upon his first idea, and from time to time added certain parts he deemed wanting until the machine arrived at its present stage. It is not quite perfect yet and will require some other changes, so we are assured, to make it still more effective. A brief explanation will render the working details of this engine intelligible to the reader.

The cylinder, A, is mounted on a bed-plate, as usual; it is 14 inches in diameter and about 20 inches face. Around the outside of the cylinder there is a steam jacket, which the exhaust passes through and prevents internal condensation. The cylinder has two steam chests, B B, bolted to it, in which are the reversing valves, C, and the main valves which admit the steam to perform the revolutions of the piston; one of these last-mentioned valves can be seen at D; the other one is hidden by the intervention of the throttle valve-chamber between it and the observer. The steam chests (one above and the other below) are separated by the rectangular opening, E. This opening and the parts belonging to it comprise the principal feature of the engine, that is the sliding partition. Other inventors have essayed the same feature, but the method by which the motion is produced is novel to us. The partition is simply a metallic block, fitted with steam-tight packing, working in the opening just-mentioned. The partition is connected with the operating machinery by rods (like valve stems) fastened to each end of it and working through the guides, F, bolted across the opening. To these rods the cross-head, G, is keyed. The cross-head is of the spade-handle variety, and embraces a small steam cylinder, H (between the rods), whose piston rod is attached to the cross-head by nuts, as seen at I. Let us now examine the means by which this partition is worked so as to open and close the connection in the cylinder. On the main shaft, J, there is a wheel, K, secured, which has a cam groove in it partially seen at L; in this groove a sliding block is fitted which is in turn secured to the long arm, M. To this arm the rod, N, is jointed to the rock-shaft arm, O. On this shaft are two other arms, P, the ends of which work in recesses in the cross-head prepared for their reception. These arms and the steam cylinder before-described move the partition in and out. As the piston revolves the partition is, of course, stationary until the motion brings the piston around to the movable partition. When this takes place the partition recedes swiftly, and the piston passes by to continue its stroke. Immediately on its passage the partition flies back in close contact with the main body of the piston drum and is kept there by the pressure in the small cylinder. A reciprocating mo-

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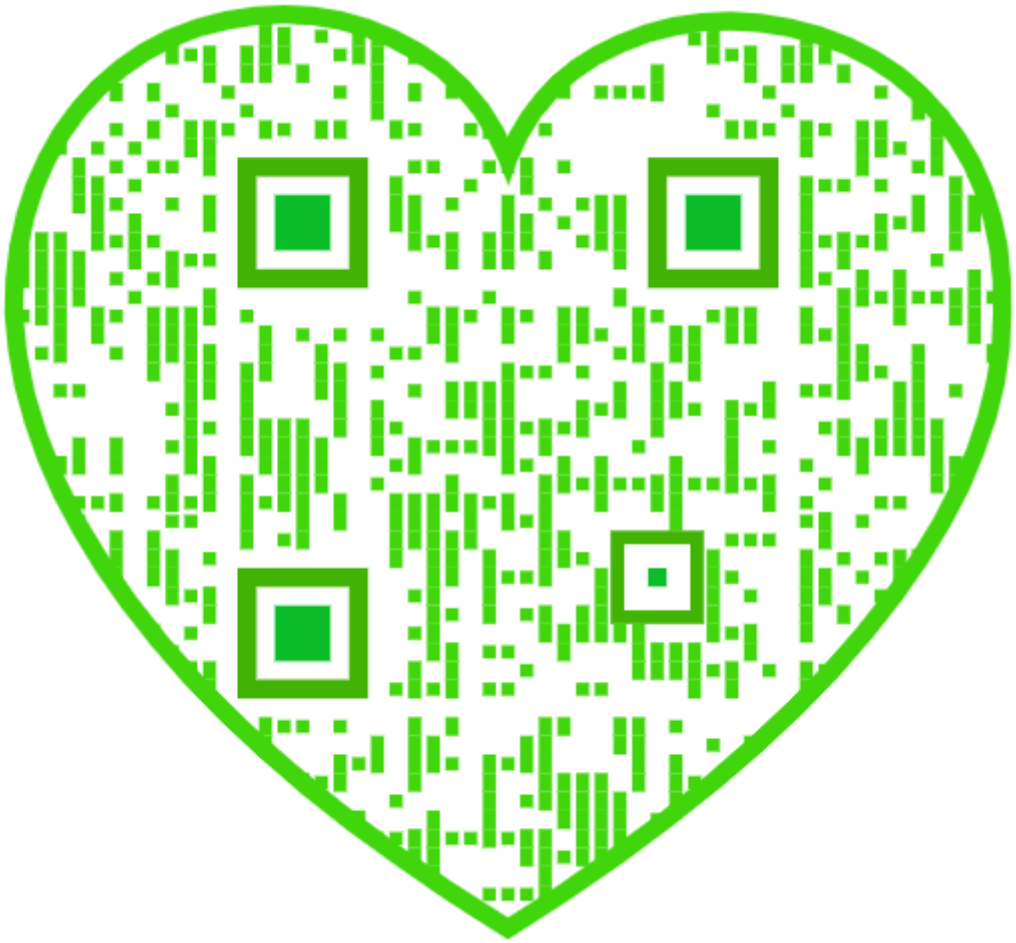

tion is given to the smaller steam piston contained in the cylinder, H, by an eccentric groove in the gear, Q; from this groove motion is transmitted by the arm, R, and the shaft it is keyed on, to the valve stem, worked by the vertical arm, S. Let us now turn to the means which admit the live steam to the main piston, and if we do so we shall see that there is a large iron disk, T, on the main shaft, which has a groove, U, formed on its edge by metallic strips; in this groove the rod, V, engages and (being fastened at the opposite end from the reader) moves the slide, W, as the piston revolves. On this slide there is an upright arm, X, on which the valve stems, D, heretofore-mentioned, are secured; they work through the small stuffing-boxes, seen in close proximity to them. The valves themselves are in the same chests as the reversing valves. The reversing valves are contained in either chest, and connected by side-rods to the cross-heads, Y—one in sight, the other invisible under the steam-chest. The handle projecting in front is provided for the purpose of changing the motion of the engine forward or backward by shifting the reversing valves either way.

We have thus described the principal details of this invention, and having exhausted the alphabet we shall proceed no further in this direction. The operation of the engine is very similar to all others. The piston (a single one fitted in a drum) revolves as the steam enters through the pipes, Z. When it nears the sliding partition the latter recedes and permits it to pass by, closing immediately thereafter. When the piston slides over the opening made by the secession of the partition, the packing in the end of it would strike the sharp edges were not some provision made to guard against such disaster. This is done by means of another cam (not seen in the engraving), which draws the packing into the piston and lets it rotate without injury. So also with the arrow-headed indicator and scale; the other end of this instrument works in a straight groove turned in the main shaft. If the lateral movement of the piston drum is too great it is immediately shown on an exaggerated scale by the indicator.

The inventor of this machine admits that it is very complicated, and thinks he could simplify it materially by making another. The steam leaked out considerably through the partition opening when we saw it in operation, caused, we were told, by defective workmanship. All the small cocks about the engine are provided for the purpose of drawing off the condensed water. The engine will, in our opinion, require much cutting down before it will be as efficient as it should be, and the hammering and pounding caused by the opening and shutting of the partition should be obviated as far as possible. This engine was patented on Sept. 3, 1861, by C. Christensen, of New York. One half of the patent has been assigned to C. and A. Hövet, corner of Myrtle and Carlton avenues, Brooklyn, N. Y.

THE PLAGUE OR "BLACK DEATH."

We have just received from Daniel E. Delavan, City Inspector of New York City, a copy of his annual report for 1862, which is of unusual interest. It contains a complete review of the sanitary condition of the city during that year, with much other matter relating to the causes of disease and sanitary reform. We thank Inspector Delevan for this report, which we regard as a most valuable contribution to sanitary literature. As an example of the interest which attaches to this volume, we refer the reader to the following graphic account of the "Plague":—

The "Black Death," or, as it was called in some countries, the "Great Mortality," was preceded by mighty revolutions in the organism of the earth, of which we have credible information. From China to the Atlantic, the foundations of the earth were shaken; throughout Asia and Europe the atmosphere was in commotion, and endangered, by its baneful influence, both vegetable and animal life.

The series of these great events began in the year 1333, fifteen years before the plague broke out in Europe; they first appeared in China. Here a parching drought, accompanied by famine, commenced in the tract of country watered by the rivers Kiang and Hoai. This was followed by such violent torrents of rain, in and about Kingsai, at that time the capital of the empire, that, according to tradition, more than 400,000 people perished in the floods. Finally, the mountain Tsincheon fell in, and vast clefts were formed in the earth. In the succeeding year (1334), passing over fabulous traditions, the neighborhood of Canton was visited by inundations; whilst in Tche, after an unexampled drought, a plague arose, which is said to have carried off about 5,000,000 people. A few months afterwards an earthquake followed, at and near Kingsai; and, subsequent to the falling-in of the mountains of Ki-ming-chan, a lake was formed of more than a hundred leagues in circumference, where, again, thousands found their grave. In Howkouang and Ho-nan a drought prevailed for five months; and innumerable swarms of locusts destroyed the vegetation, while famine and pestilence, as usual, followed in their train. Connected accounts of the condition of Europe before this great catastrophe are not to be expected from the writers of the fourteenth century. It is remarkable, however, that simultaneously with a drought and renewed floods in China, in 1336, many uncommon atmospheric phenomena, and in the winter frequent thunder storms, were observed in the north of France; and, so early as the eventful year of 1333, an eruption of Etna took place. According to the Chinese annals, about 4,000,000 of people perished by famine in the neighborhood of Kiang in 1337; and deluges, swarms of locusts, and an earthquake which lasted six days, caused incredible devastation. In the same year, the first swarms of locusts appeared in Franconia, which was succeeded, in the following year, by myriads of those insects. In 1338, Kingsai was visited by an earthquake of ten days' duration: at the same time, France suffered from a failure in the harvest; and, thenceforth, till the year 1342, there was in China a constant succession of inundations, earthquakes and famines. In the same year, great floods occurred in the vicinity of the Rhine, and in France, which could not be attributed to rain alone; for, everywhere, even on the tops of mountains, springs were seen to burst forth, and dry tracts were laid under water in an inexplicable manner. In the following year, the mountain Hong-tchang, in China, fell in, and caused a destructive deluge; and, in Pien-tcheou and Leang-tcheou, after three months rain, there followed unheard-of inundations, which destroyed seven cities. In Egypt and Syria, violent earthquakes took place; and, in China, they became from this time, more and more frequent; for they recurred in 1344, in Van-tcheou, where the sea overflowed in consequence, in 1345, in Hi-tcheou, and in both the following years in Canton, with subterraneous thunder. Meanwhile, floods and famine devastated various districts, until 1347, when the fury of the elements subsided in China.

The signs of terrestrial commotions commenced in Europe in the year 1348, after the intervening districts of country in Asia had probably been visited in the same manner.

On the island of Cyprus, the Plague from the East had already broken out; when an earthquake shook the foundations of the island, and was accompanied by so frightful a hurricane that the inhabitants who had slain their Mahometan slaves, in order that they might not themselves be subjugated by them, fled in dismay, in all directions. The sea overflowed—the ships were dashed to pieces on the rocks, and few outlived the terrific event, whereby this fertile and blooming island was converted into a desert. Before the earthquake, a pestiferous wind spread so poisonous an odor, that many, being overpowered by it, fell down suddenly, and expired in dreadful agonies. This phenomenon is one of the rarest that has ever been observed, for nothing is more constant than the composition of the air; and in no respect has nature been more careful in the preservation of organic life. Never have naturalists discovered in the atmosphere foreign elements, which, evident to the senses and borne by the winds, spread from land to land, carrying disease over whole portions of the earth, as is recounted to have taken place in the year 1348. It is, therefore, the more to be regretted, that in this extraordinary period, which, owing to the low condition of science, was very deficient in accurate observers, so little that can be depended on respecting those uncommon occurrences in the air should have been recorded.

Yet, German accounts say expressly that a thick, stinking mist advanced from the East and spread itself over Italy; and there could be no deception in so palpable a phenomenon.

The credibility of unadorned traditions, however little they may satisfy physical research, can scarcely be called in question when we consider the connection of events; for just at that time earthquakes were more general than they had been within the range of history. In thousands of places chasms were formed, from whence arose noxious vapors; and, as at that time natural occurrences were transformed into miracles, it was reported that a fiery meteor, which descended on the earth far in the East, had destroyed everything within a circumference of more than a hundred leagues, infecting the air far and wide. The consequences of innumerable floods contributed to the same effect, vast river districts had been converted into swamps; foul vapors arose everywhere, increased by the odor of putrified locusts, which had never perhaps darkened the sun in thicker swarms, and of countless corpses, which, even in the well-regulated countries of Europe, they knew not how to remove quickly enough out of the sight of the living. It is probable, therefore, that the atmosphere contained foreign and sensibly perceptible admixtures, to a great extent, which, at least in the lower regions, could not be decomposed, or rendered ineffective by separation. Pursuing the course of these grand revolutions further, we find notice of an unexampled earthquake, which, on the 25th of January, 1348, shook Greece, Italy, and the neighboring countries. Naples, Rome, Pisa, Bologna, Padua, Venice, and many other cities suffered considerably. Whole villages were swallowed up, castles, houses and churches were overthrown, and hundreds of people were buried beneath their ruins. In Carinthia, thirty villages, together with all the churches, were demolished; more than a thousand corpses were drawn out of the rubbish; the city of Villach was so completely destroyed that very few of its inhabitants were saved; and, when the earth ceased to tremble, it was found that mountains had been moved from their positions, and that many hamlets were left in ruins. It is recorded that, during this earthquake, the wine in the casks became turbid, a statement which may be considered as furnishing a proof that atmospheric changes, of a character hitherto unknown, had taken place; but if we had no other information from which the excitement of conflicting powers of nature, during these commotions, might be inferred, yet scientific observations, in modern times, have shown that the relation of the atmosphere to the earth is changed by volcanic influences. Why, then, may we not, from this fact, draw retrospective inferences respecting those extraordinary phenomena? Independently of this, however, we know that, during this earthquake, the duration of which is stated by some to have been a week and by others a fortnight, people experienced an unusual stupor and headache, and that many fainted away.

These destructive earthquakes extended as far as the neighborhood of Basle, and recurred, until the year 1360, throughout Germany, France, Silesia, Poland, England and Denmark, and much further north.

Great and extraordinary meteors appeared in many places, and were regarded with superstitious horror. The order of the seasons seemed to be inverted; rains, floods, and failures in crops were so general that few places were exempt from them; and though an historian of that century assures us that there was an abundance in the granaries and storehouses, all his cotemporaries, with one voice, contradict him. The consequences of failure in the crops were soon felt, especially in Italy and the surrounding countries, where, in this year, a rain which continued for four months, had destroyed the seed. In the larger cities they were compelled, in the spring of 1347, to have recourse to a distribution of bread among the poor, particularly at Florence, where they erected large bake-houses, from which, in April, ninety-four thousand loaves of bread, each of twelve ounces in weight, were daily dispensed. It is plain, however, that humanity could only partially mitigate the general distress, not altogether obviate it.

Diseases, the invariable consequence of famine, broke out in the country, as well as in cities; children died of hunger in their mothers' arms; want,

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misery, and despair were general throughout Christendom.

Such are the events which took place before the eruption of the Black Plague in Europe. Cotemporaries have explained them after their own manner, and have thus, like their posterity, under similar circumstances, given a proof that mortals possess neither senses nor intellectual faculties sufficiently acute to comprehend the phenomena produced by the earth's organism, much less scientifically to understand their effects. Superstition, selfishness in a thousand forms, the presumption of the schools, laid hold of unconnected facts. They vainly thought to comprehend the whole in the individual, and perceived not the universal spirit which, in intimate union with the mighty powers of nature, animates the movements of all existence, and permits not any phenomenon to originate from isolated causes. To attempt, five centuries after that age of desolation, to point out the causes of a cosmical commotion, which has never recurred to an equal extent—to indicate scientifically the influences which called forth so terrific a poison in the bodies of men and animals, exceeds the limits of human understanding. If we are even now unable, with all the varied resources of an extended knowledge of nature, to define that condition of the atmosphere by which pestilences are generated, still less can we pretend to reason retrospectively from the nineteenth to the fourteenth century; but if we take a general view of the occurrences, that century will give us copious information, and, as applicable to all succeeding times, of high importance.

In the progress of connected natural phenomena, from east to west, that great law of nature is plainly revealed which has so often and evidently manifested itself in the earth's organism, as well as in the state of nations dependent upon it. In the inmost depths of the globe, that impulse was given in the year 1333, which, in uninterrupted succession for six and twenty years, shook the surface of the earth, even to the western shores of Europe. From the very beginking the air partook of the terrestrial concussion; atmospherical waters overflowed the land, or its plants and animals perished under the scorching heat. The insect tribe was wonderfully called into life, as if animated beings were destined to complete the destruction which astral and telluric powers had begun. Thus did this dreadful work of nature advance from year to year; it was a progressive infection of the zones, which exerted a powerful influence both above and beneath the surface of the earth; and, after having been perceptible, in slighter indications, at the commencement of the terrestrial commotions in China, it convulsed the whole earth.

The symptoms of this fearful disease, like all others, were not always the same; accordingly we find some patients struck down almost as by lightning and die upon the spot, while others were attacked with a violent pain in the head, followed by stupor, finally falling into a deep sleep, losing their speech from palsy of tongue; others remained sleepless and without rest. The tongue and throat were often black and swollen, with blood exuding, the tumefaction being so great that neither drink nor food could be taken, the thirst and suffering continuing without alleviation until terminated by death. Others would be seized with violent inflammation of the lungs, accompanied with a terrible pain in the chest, which would soon be followed with profuse expectoration of blood and pestiferous odor of the breath. Some would have an ardent fever from the beginning, accompanied by an evacuation of blood; these patients usually died in about three days. When the patient survived the first attack, large buboes in the groin and under the arm and inflammatory boils all over the body made their appearance.

In Egypt, the symptoms were inflammation of the lungs, with burning heat, and expectoration of blood, which destroyed quickly and infallibly. In Florence it commenced, not as in the East, with bleeding from the nose, a sure sign of inevitable death; but there took place, at the beginning, both in men and women, tumors in the groin and in the axilla, varying in circumference up to the size of an egg, and called by the people pest-boils. Then there appeared similar tumors indiscriminately over all parts of the body, and black or blue spots came out on the arms or thighs, or on other parts, either single and large, or small and thickly studded. These spots proved equally fatal with the pest-boils, which from the first had been regarded as a sure sign of death. No power of medicine brought relief—almost all died within the first three days, some sooner, some later, after the appearance of these signs, and for the most part entirely without fever or other symptoms.

So universal was this disolve that it even attacked and destroyed large number of animals. Boccacio saw two hogs, lying on the rags of a person who had died of plague, and after staggering about for a short time they fell dead, as if they had taken poison. In other places, multitudes of dogs, cats, fowls, and other animals, fell victims to the contagion. In England a fatal murrain took place among cattle. Wandering about without herdsmen, they died by thousands.

We have no certain measure by which to estimate the ravages of the black plague, definitely, from a want of knowledge of the amount of the population; and, moreover, the traditional statements of the amount of this loss are so vague, that there is only room for probable conjecture. I will therefore confine myself to exhibiting some of the more credible accounts relative to European cities, and of some other places, that are regarded by historians as being reliable:—

In Florence there died of Black Plague	60,000
In Venice	100,000
In Marseilles (in one month)	16,000
In Siena	70,000
In Paris	50,000
In St. Denys	14,000
In Avignon	60,000
In Strasburgh	16,000
In Lubeck	9,000
In Basle	14,000
In Erfurt, at least	16,000
In Weimar	5,000
In Limburg	2,500
In London, at least (in 1664)	68,596
In Norwich	51,100
To which may be added—	
Franciscan Friars in Germany	124,434
Minorites in Italy	30,000

This short catalogue could be further multiplied, but would still fail to give a true picture of the depopulation which took place. Lubeck, at that time the Venice of the North, which would no longer contain the multitudes that flocked to it, was thrown into such consternation on the eruptions of the plague, that the citizens destroyed themselves, as if in frenzy. Merchants, whose earnings and possessions were unbounded, coldly and willingly renounced their earthly earnings. They carried their treasures to monasteries and churches, and laid them at the foot of the altar; but gold had no charms for the monks, for it only brought them death. They shut their gates; yet, still it was cast to them over the convent walls. In some place the church-yards were soon unable to contain the dead. They were then arranged in layers, by thousands, in large pits outside the cities. In Avignon, the Pope found it necessary to consecrate the Rhone, that bodies might be thrown into the river without delay, as the church-yards would no longer hold them. It many places, it was rumored that plague patients were buried alive, as may sometimes happen through senseless alarm and indecent haste. Morals were deteriorated everywhere, and the service of God was, in a great measure, laid aside. The instruction of the people was impeded, covetousness became general; and when tranquillity was restored, the great increase of lawyers was astonishing, to whom endless disputes, regarding inheritances, offered a rich harvest. The sittings of Parliamant, of the King's Bench, and most of the other courts were suspended as long as the malady raged. The laws of peace availed not during the dominion of Death.

Cairo lost, daily, when the plague was raging with its greatest violence, from 10,000 to 15,000. In China, more than 13,000,000 are said to have died. India was depopulated. The kingdom of Tartary was covered with dead bodies. In Caramania and Cæsarea, none were left alive. On the roads, in the camps, in the caravansaries, unburied bodies alone were seen. In Aleppo, 500 died daily; 22,000 people, and most of the animals, were carried off in Gaza, within six weeks. Cyprus lost almost all its inhabitants; and ships without crews were often seen in the Mediterranean, as afterwards in the North Sea, driving about entirely unmanned.

It was reported that, throughout the East, excepting China, 23,840,000 people had fallen victims to the Plague. In all Germany, 1,244,434 were calculated to have died. Of all the estimates of the number of lives lost in Europe, the most probable is, that, altogether, a fourth part of the inhabitants were carried off.

It may, therefore, be assumed, without exaggeration, that Europe lost, during the Black Death, 25,000,000 of inhabitants. The inhabitants of Iceland and Greenland found, in the coldness of their inhospitable climate, no protection against the southern enemy who had penetrated to them from happier countries. The Plague caused great havoc among them. In Russia, the mortality was extraordinarily great, and the same scenes of affliction and despair were exhibited as had occurred in other countries.

The mental shock sustained by all nations, during the prevalence of the Black Plague, is without parallel, and beyond description. In the eyes of the timorous, danger was the certain harbinger of death; many fell victims to fear on the first appearance of the distemper, and the most stout-hearted lost their confidence. Thus, after reliance on the future had died away, the spiritual union, which binds man to his family and his fellow-creatures, was gradually dissolved. The pious closed their accounts with the world—eternity presented itself to their view—their only remaining desire was for a participation in the consolations of religion, because, to them, death was disarmed of its sting.

A lively image of the Black Plague and of the moral evil which followed in its train will vividly represent itself to persons acquainted with nature and the constitution of society. Almost the only credible accounts of the manner of living, and of the ruin which occurred in private life, during this pestilence, are from Italy; and these may enable us to form a just estimate of the general state of families in Europe, taking into consideration what is peculiar in the manners of each country. "When the evil had become universal," says an old writer, speaking of Florence, "the hearts of all the inhabitants were closed to feelings of humanity. They fled from the sick and all that belonged to them, hoping by these means, to save themselves. Others shut themselves up in their houses with their wives, their children, and households, living on the most costly food, but carefully avoiding all excess. None were allowed access to them; no intelligence of death or sickness was permitted to reach their ear; and they spent their time in singing and music, and other pastimes. Others, on the contrary, considered eating and drinking to excess, amusements of all descriptions, the indulgence of every gratification, and an indifference to what was passing around them, as the best medicine; and they acted accordingly—they wandered day and night from one tavern to another, and feasted without moderation or bounds. In this way they endeavored to avoid all contact with the sick, and abandoned their houses and property to chance.

"Amid this general lamentation and woe the influence and authority of every law, human and divine, vanished. Most of those who were in office had been carried off by the plague, or lay sick unable to attend to their duties."

The Plague in London is thus described:—"Vast numbers of people fled in panic terror from that fatal city; servants and work-people were discharged in great numbers; commerce was paralyzed; few ships ventured up the river, and merchant vessels were occupied by their owners as asylums on the water. Sextons, grave-diggers, bearers, bellmen, and drivers of death-carts were in demand. The dead were buried indiscriminately; some bodies lay in forsaken houses, others across the paths in the streets, no longer traversed by carts or coaches. At the end of the summer, grass was growing in Bishopsgate street and Cornhill, where the people thronged no longer. The loud voices, shrieks, and sobs of the delirious, the desolate, and the dying were heard in the streets, at times, too, disturbed by reckless travelers and by raving patients, who had escaped from their dwellings, converted into prisons; for, according to the regulations, 'infected houses' were shut up, a red cross, and 'Lord have mercy upon us!' were inscribed on their portals, while watchmen jealously guarded the doors. These quarantine regulations were at first rigidly carried out, and were only gradually abandoned when they were found useless, pernicious, and impracticable."

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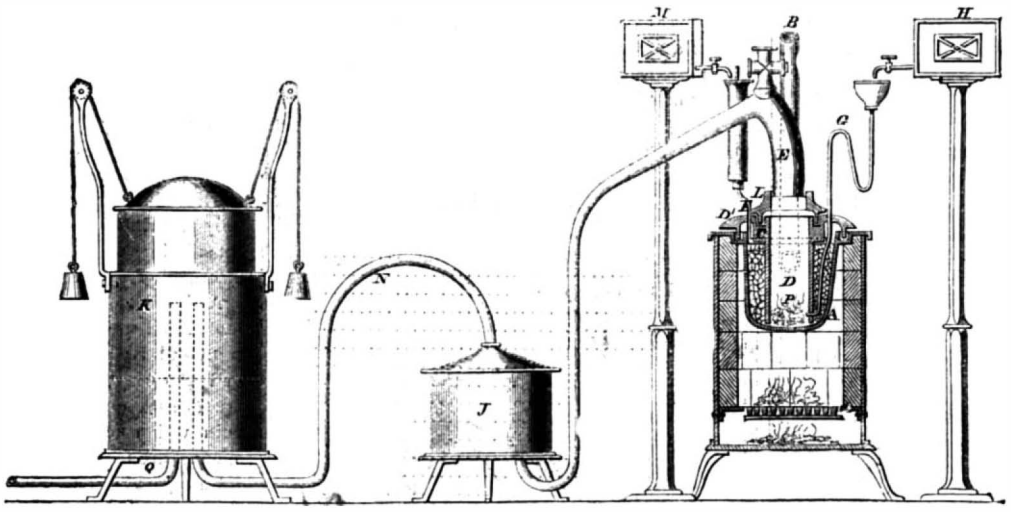
Gas from Petroleum.

Gas is the most beautiful and convenient system of artificial illumination, and in cities and large villages it is, perhaps, the cheapest light; but illuminating gas may be made from quite a variety of substances, and different circumstances may rule the choice of these for objects of economy. Where good coal is cheap, or even moderately cheap, and the quantity of gas required is large, coal, thus far, has been found to be the cheapest gas material. In some situations resin has been used as the most suitable substance for making gas, but as this material cannot now be obtained in sufficient quantities, petroleum has been proposed as a substitute. The great abundance and general low cost of this material has also raised a question lately, whether it may not take the place of coal as well as resin. And in combination therewith the gas of decomposed water has been proposed to secure more economical results.

The accompanying engraving represents an improved gas-making apparatus based upon the above ideas, patented by J. E. Thomson, of Buffalo, N. Y., on May 20th, last year; the description is copied from the patent. A represents the vertical section of a portable retort having a fire-chamber with an attached chimney, B. The furnace is surmounted by a hemispherical retort, C, which includes a central hollow cylinder, D, open at the bottom and connected at the top with the eduction pipe, E. The lid, L, fits tightly over the cylinder, D, by sealed joints. The rim, D′, is cast with the cylinder, and forms a cover to the furnace, fitting thereon by sealed joints. The eduction pipe, E, fits tightly into the top of the inner cylinder. A pipe, F, conducts the petroleum from the reservoir, M, into the retort. This pipe is continued around the body of the cylinder, D, within the retort, as shown by the dotted lines, and it has numerous holes in it for the petroleum to percolate and drop into the retort. A siphon is represented at C, for conducting water from a reservoir, H, into the cylinder, D. It opens into it in such a manner that the water will spirt upon the red-hot coke or charcoal, or upon lumps of fire-brick contained in an enlargement of the pipe within the cylinder. J represents a purifying vessel, into which the eduction pipe, E, leads. Hydrochloric acid, diluted with water, is used in this vessel for deodorizing or purifying the gas. After the hydrochloric acid is mixed with the water in the washing vessel, the process of washing and purifying is conducted in the usual manner. K represents a gasometer of usual construction connected with the washing vessel by the pipe, N, the gas passing from the purifier through the pipe to the gasometer. The gas is taken from the gasometer through the main pipe, Q, to the burners. The cylinder, D, is filled (or nearly so) with coke or charcoal, as shown at P, and the space between the retort and the cylinder is filled with fire-brick.



PETROLEUM GAS-MAKING APPARATUS.

Operation.—The apparatus being constructed and prepared as described, when the retort becomes red-hot, crude petroleum is allowed to flow from the reservoir, M, through the pipe, F, and trickle down upon the fire-brick within the retort (and upon the red-hot surface of the coke and retort.) The oil then decomposes into gas and volatile hydrocarbons, which pass through the interstices of the fire-brick and through the lower open end of the cylinder into the interior, where they combine and mix with the gases from the water. The water is allowed to flow from the reservoir, H, through the siphon pipe, G, and as it falls upon the red-hot charcoal or fire-brick, it is instantly changed and decomposed in the nascent state by contact with heated hydro-carbon vapor into permanent illuminating gases, and into gases (hydrogen, carbonic oxide and carbonic acid) which also pass up the cylinder, D, and eduction pipe, E, and then mingle and combine with the petroleum gases, forming a new combination gas of great illuminating power, which is purified and used as described. The retort must be kept at a red heat during the process. This process differs from those of White, Barlow, Gore and Sanders, in which water is employed as one of the agents for producing the gas. In this process the water is thrown into a spheroidal condition, and acts nascently upon the volatile hydro-carbon vapors, and converts them into permanent gases, thus preventing the condensation of hydro-carbon vapors.

The "claim" is for the manufacture and use of an illuminating gas produced by a combination of petroleum or other hydro-carbon gases—petroleum being preferred—with combination gases produced by the action of water in a spheroidal state on hydro-carbon vapors, substantially as described.

The use of water gas for illumination has never impressed us favorably. Theoretically it is a disadvantage; practically it has never yet been successful. In a few instances it has been employed with apparent good results for a short period. Its triumph has been heralded far and wide; its failure never reported by friends or dupes. Good gas may be obtained from pure petroleum, but its economy will depend upon its relative price compared with coal. In some situations near the oil wells petroleum may reasonably be expected to produce the cheapest gas, and it may be made in a retort like the one here represented, without its water arrangement. From several experiments made with petroleum, John Reid, of the Edinburgh and Leith Gas Works, Scotland, states in a letter to the London *Gas Light Journal* that he obtained 109 cubic feet of gas from a gallon of petroleum; the retort used being nearly similar to the one illustrated. It contained coke and bricks. A tun of medium cannel coal will yield 10,000 cubic feet of gas. Dr. Frankland has made experiments with different illuminating agents to test their light-giving power and relative cost. To produce the same amount of light, one gallon of Young's paraffine (coal) oil is set down as 1; American petroleum, 1·26; and these quantities gave a light equal to 26·4 pounds of wax candles; 22·9 pounds of sperm; 27·6 of stearic, and 36 of tallow. The relative cost in London was, for twenty spermaceti candles, burning ten hours, 6*s.* 8*d.*; tallow, 2*s.* 8*d.*; coal gas giving the same quantity of light, 4½*d.*; coal oil, 6*d.*; petroleum, 7⅔*d.* With respect to such results Dr. Frankland says:—"In an economical point of view, petroleum and paraffine oil approach gas very closely indeed, while the enormous quantities in which they are now being produced, cannot fail to make them still lower in price. Therefore we may look upon them as most formidable rivals to gas light." These remarks have reference to their use in lamps.

Bursting of a Fly-wheel.—A fly-wheel recently burst in the rolling-mill of Verree & Mitchell, Philadelphia, Pa. The wheel was twenty feet in diameter, and weighed nearly twelve tuns. The rim was broken into three pieces, two of which went through the roof, and the third piece landed on the boiler. The damage done will amount to nearly $1,500. The accident will stop the work in the mill for ten days or two weeks.

The Soldier's Mania Coffee.

Coffee is the soldier's luxury, deprived of which he imagines himself the worst-used individual that he is capable of conceiving. On a march, for convenience sake, the coffee and sugar are mixed together. Every man carries his tin cup or can for making his coffee, and he would as soon think of leaving his musket as the cup wherein to make his coffee. The new regiments come out very well supplied with cups, but the old soldier disdains buying a cup, and manufactures a much better one for himself. Taking one of the cans in which fruits and vegetables are preserved (and which every sutler has a full assortment of), he cuts the top entirely out, and with a piece of wire cut from some abandoned or destroyed telegraph line, he makes of it a handle (technically a "bail") and his coffee pail is complete. The moment a halt is made, the soldier commences making his coffee. Some water from his canteen or a neighboring brook or spring is soon boiling briskly over a little fire of glowing embers. Upon this boiling water he pours his coffee and sugar, and by the time the coffee has settled to the bottom and the sugar is dissolved, the beverage is ready for use. Coffee-drinking is a passion with soldiers which amounts to a mania. A five minutes' halt on a march, and a soldier must have his coffee. If he straggles behind and escapes the provost guard, he sits down and contentedly makes his coffee. If he strays off the road to some of the "hospitable mansions" (?) by the road side, his first request is to be allowed to make a little coffee in the fire-place; and on halting for the night, no matter how tired he may be, he cannot by any possibility spread his blanket until he has enjoyed his cup of hot coffee. The immoderate use of coffee is productive of much of the diarrhœa of the camp, but, taken in reasonable quantities, such an effect would rarely be produced. Attempts have been made to substitute tea for coffee, but with no success. Soldiers think more of their coffee than all the rest of their rations. They do not like tea; and though, when issued in lieu of coffee, they will use it, yet they grumble not a little at the substitution.—*Medical Reporter.*

A New Comet.

A comet was discovered in France about the middle of last April, the following approximate elements of which were communicated to the London *Times* of the 18th ult., by that eminent astronomer, J. R. Hind, Esq. Mr. Hind states they were deduced from observations at Paris on April 14th, and at Florence on April 15th and 16th. Perihelion passage, March 22d—8 P. M.—M. T. Greenwich. Longitude of perihelion 261° 11′; longitude of node 244° 25′; inclination 86° 34′; least distance from the sun 0.9,899; motion retrograde. Mr. Hind remarks that this appears to be a comet not previously computed. Its distance from the earth on April 17, was about 67 millions of miles, or 7-10ths of our distance from the sun, but the distance for a few days would slowly diminish; the brightness of the comet, however, would not probably increase. On April 18, 12 hours, M. T. G., the A. R. of comet was 20h. 29m; declination 12° 22′ North. April 22, 12 hours, A. R. 20h. 23m; declination 21° 58′ North.

A Musical Bed.—Foreign journals speak of an invention just produced in Germany, namely, a musical bed, so constructed that, by means of a concealed piece of mechanism, the pressure of the body produces the softest harmony, which lasts long enough to lull one to sleep. At the head of the bed is a dial with a hand which can be placed at whatever hour the person wishes to awake; and at the time fixed the bed plays a march of Spontini, with drums and cymbals, loud enough to wake the soundest sleeper.

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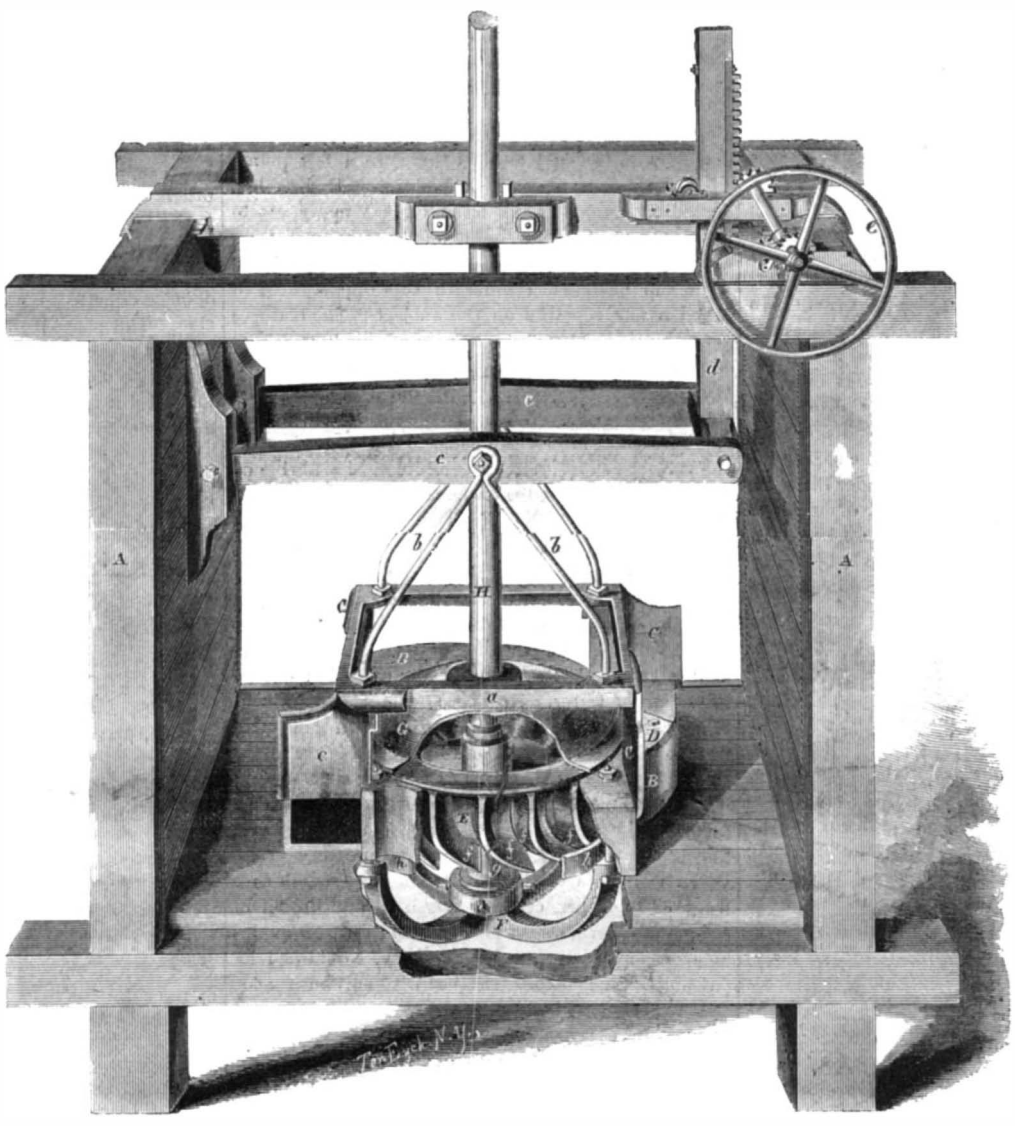
Improved Water-wheel.

This wheel is one of a class of water motors which have come into extensive use of late years. They are extremely simple in their action and construction, and involve no more attendance than an ordinary wheel. In addition to these qualities they give out a large amount of power in comparison with their size and amount of water applied. Our engraving shows the wheel (part of the chutes being broken away), set in the large wooden penstock, A, and has attached to the chutes, B, four gates, C, which open or close the chutes; these gates are connected together by a square frame (*a*); from the corners of the latter, four wrought iron rods, *b*, proceed, which are fastened at the top to the transverse wooden bars, *c c*, by means of the lever, *d*. When these bars are raised they carry the gates with them, and consequently start the wheel. Inside of the broken chute, B, may be seen the wheel, E; it consists of a concave hub, keyed fast to the shaft, *e*, having the buckets, *f*, secured to its periphery by four bolts in each, so that in case of breakage new buckets can be substituted for the damaged ones. By this shape of the hub and bucket, the water first acts directly on the upper or straight part of the bucket, and then by the concave hub it is passed down to the lower or curved part, and acts by its gravity, the step, *g*, is also relieved of a part of the superincumbent weight, by the conformation of the hub. The cover, G, is secured to the top of the four chutes by bolts and is turned out in the center to fit the shaft, H, which prevents any leakage. This wheel is made solely of cast and wrought iron (except the step), and is accurately turned and fitted in all its parts; it is the invention of N. F. Burnham, of Laurel Factory, Maryland, and was patented through the Scientific American Patent Agency, on Feb. 22, 1859; further information can be had by addressing the patentee, N. F. Burnham, Variety Iron Works, York, Pa.



BURNHAM'S PATENT TURBINE WATER-WHEEL.

Training Fruit Trees in Gardens.

The following remarks relating to the training of fruit trees are condensed from the address of Mr. George Laing, before the Canadian Board of Agriculture, and published in the journal of that board :—

"There are various forms in which the fruit tree is trained for the open garden and orchard. All varieties, either of the pear, the apple, or other kinds of fruit, are not all eligible alike for pyramids and bushes as they are termed. Some incline to grow compact and neat, others horizontally or bushy, and some very thin and slender. Whatever the fancy may be, as to the shape that the tree is to be trained, the varieties best suited should be selected; those of compact, erect habit are the best for pyramids; the horizontal growers, or those of a crooked nature, for bushes; the thin and slender growers, of whatever shape they are to be, require to be well attended to when young, as they are all, with few exceptions, apt to be furnished with dormant buds on the lower part of the branches; this, by early short pinching may be greatly obviated. It is very desirable to have all trees that are purposed to be of small stature on dwarf stocks—the pear on the quince, the apple on the English crab and Paradise stock, the plum on the sloe, the morella and duke cherries on the mahaleb, the bigarreau and heart cherries on the common cherry stock. The pear, the apple, the cherry and all of the other varieties mentioned are well adapted for dwarf culture, which has been admitted, by all who have practiced it extensively, to be the most interesting and the best. The plum in a rich soil rapidly forms a pyramid; it can scarcely be managed by summer pinching, as it is of such a rapid growth. It is, however, a tree whose roots keep near the surface, and can easily be kept down by annual or biennial root-pruning, whichever may be adopted. Cut all the roots, and as the tree advances and years roll on, every time the roots are pruned, cut within a few inches of the former stump. Some cultivators approve of removing the trees annually, if the soil be rich; biennially and adding some rich composts, if it be poor. This is to be done without root pruning, commencing the second year after planting, performing the operation in the end of October or the beginning of November, as the tree may be found in condition. Lift them carefully, preserving all the roots unless any stragglers; then make the hole, from whence the tree was moved, a little deeper and of sufficient breadth to receive the roots at full length; place a little of a prepared compost of loam and rotten dung in the bottom, then place the tree in the center and carefully spread out all the roots and cover them over with a little of the compost; when that is done fill in the common earth and tread it down firmly with the foot, then mulch all over.

"Summer pinching is an essential operation. It is done by the finger and thumb, and by a timely use of them the tree may in a great measure be summer pruned. In exemplifying this operation, take a young pear tree of one year from the bud or graft, say for a pyramid. A good, well-rooted plant, with a single upright stem well furnished with buds, should be selected. In the first spring head it down to within eighteen inches of the ground; if the soil be rich it will produce five, six, or more shoots, one of which is to be made the leader; and if not quite erect it must be made so by fastening it to a stake, and as soon as the leading shoot is ten or eleven inches long, stop it by pinching off its end. If it pushes forth again two or more shoots, pinch all off but from one to three leaves, leaving the topmost for a leader. The side shoots in general assume a regular form; should they not do so stake them into it, taking care not to have them too close. They may thus remain until the end of August or the beginning of September, when they may be shortened to eight, ten or more buds, as may be found necessary to the formation of the tree. The second year the tree will make strong vigorous growth; the side shoots that were stopped last fall will push out three, four or more shoots. In June, or as soon as they have made four or five leaves, pinch them off to three leaves, leaving the leading shoots of the side branches unpinched, to extract the superabundant sap till the end of August. As fruit trees differ in their habits—some varieties making strong vigorous shoots, others, under precisely the same treatment, weak and slender—this must be noticed in the final shortening in August, those that are vigorous must not be cut so short as those that are less so. The fact is, every variety requires some little modification, more or less, which experience alone can teach. Year after year continue on in this manner, taking care to keep your trees in a proper form, open and free for the circulation of air. Be careful in dressing back spurs, and in renewing branches where necessary. The apple, plum, cherry, &c., may all be treated in a similar manner for pyramids.

"The bush tree, so called, is well adapted for all situations, if the climate be good. It is very suitable for elevated, exposed places, if not much subjected to high winds. Some varieties of the pear, the apple, and other fruits are naturally inclined to be bushy and dwarfish; some of the other fruits are likewise so. The horizontal and crooked-growing sorts are the best for this purpose, and can very easily be brought into shape. The bush tree may be grown from four to six, ten, or twelve feet high, and of a proportionable breadth. The bush tree is treated similar to the pyramid in pinching and pruning, but with a difference in training; in this case no leaders are required, all the branches are naturally drawn out, pinched regularly, equally branched, but not crossed in any way. With the bush as with the pyramid, sufficient openness must be kept in view.

"All orchard owners would find it much to their advantage to keep their orchards clean, their trees free of dead wood and useless saplings; very little time need be spent in doing this, if judiciously gone about. Early in spring take a sharp draw-hoe or some like instrument, scrape and clean the trunks or stems and limbs of all the moss and dried bark, then wash them over with a thin solution of soft soap, destroy all root-suckers and mulch over the roots regularly. A little attention in this way will be amply rewarded at the proper season by boughs laden with blossoms, and, in due time, the luscious fruit."

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Correspondence

Frictional Gearing.

MESSRS. EDITORS:—You ask for information concerning frictional gearing. Perhaps what little I can say may contain something new. I am now using a machine that has a pair of friction gears to operate it, viz., a wheel 36 inches in diameter, driven by a pinion only 3½ inches in diameter. The pinion shaft revolves fifty times per minute; it requires and is driven with a 3-inch rubber belt. Though revolving so slowly and being so unequal in size, the gears carry perfectly. The pinion has its face formed like an A; the large wheel has a corresponding V, ¾ inch deep. This, I should say, is the frictional gearing proper, and is calculated to carry much more in proportion to the surfaces impinging than the flat peripheries, which are not frictional but tractional gears, seeing that the surfaces roll while operating. On the other hand there is constant friction on the A and V surfaces; but, in my opinion, not more than there is in toothed gearing—probably not so much, unless the teeth are of the most approved form and finish. If the wheels are merely in motion, without being at work, it would appear and it really does take more power to revolve them in that condition than toothed gears, because the pressure of the surfaces is constant; while in the common gear, under the same circumstances, there is often considerable of noise and frivolity [?], designated "backlash" &c. Undoubtedly the amount of frictional surface may be so disproportionate to the power to be transmitted as to require an injurious degree of pressure on the gears to make them do their work; hence, perhaps, the notion of their great absorption of power, particularly when running without work.

W. CLEMSON.

Middletown, N. Y., May 11, 1863.

[This is the kind of information that we desire, and we hope that our mechanics throughout the country will favor us with their experience on the subject. As we have often remarked in the SCIENTIFIC AMERICAN, it is high time that the noisy, jarring, unequally-balanced toothed wheels were driven from the workshop to the scrap heap, and their places supplied by the silent and efficient friction wheels. Who will institute a series of experiments between the apparent and actual results of the economical working of friction gears against toothed gears? We will publish the results of the experiments with pleasure.—EDS.

MESSRS. EDITORS:—Seeing communications from different persons about frictional gearing, I have thought that my experience might be interesting. I have used iron and iron friction gears together, iron and wood (endwise), wood and wood, leather and iron, and also the grooved friction gearing. I find iron and iron work very well in slow motion, where the shafts are kept in line. Wood and wood work very well, but they are not durable. Iron working on wood endwise works well, but if there is any spring to the shafts holding the gears, they are apt to wear uneven in course of time, by wearing deeper at the joint. But I find that cast-iron wheels with leather on the pinion, work the best; they are less liable to slip, wear true and are cheapest in the end. In making the leather pinions I pack the leather up edgewise, screwing it tight between a couple of flanges while wet and soft, turning off when dry and hard. [A most excellent plan.—EDS.] For large pinions I use segments or strips cut off straight and bent edgewise, then clamped the same as small ones, having a projection on the flange to prevent the wheel crowding the leather toward the center and body. The same face and diameter are equal to a belt of same width and diameter of pulley. As to the grooved gearing of the English pattern, the point or outer end has to travel over more space than the part nearer the center, consequently there is a slip at the point and root of each, and where there is slip there is also wear—a useless consumption of power. My experience with them is small, however, compared with the others described. I have seen a good set of grooved gears (of cast iron) wear out in three or four weeks, when leather and iron, in the same place, will last three years on the same work. I find there is nothing equal to friction gearing where there is a constant throwing in and out of gear, such as hoisting or running back, and feed in mills, &c.

A. S. W.

May 9, 1863.

[Our readers will see that all the testimony we have published is conclusive on the main point, that is, the friction wheels are reliable and work satisfactorily in general. In view of such facts it is extraordinary that so many toothed gears should be manufactured.—EDS.

Constituents of Corn in Fermentation.

MESSRS. EDITORS:—On pages 134, 150, 166, 197 and 214, current volume of the SCIENTIFIC AMERICAN, under the head of "The Distillery Business," I find a communication containing many valuable hints to distillers on the subject, still there are a few points which I think want some explanation. Having had a good opportunity to examine a great many establishments in the United States from west to east, on account of my patent, and being somewhat acquainted with the business, I embrace this opportunity to make a few remarks on the subject. The last five years have developed the science of this branch to a considerable extent. On page 134, I find it stated that woody fiber, paper, raw cotton, flax, cotton and linen rags, and sawdust, all contain starch. Now this statement might lead some to a wrong view on the subject; those articles contain mostly fibrine or cellulous matter, and will never produce sugar and alcohol by the action of diastase or malt; still when treated with sulphuric or muriatic acid, those substances can be converted into sugar or alcohol. The average quantity of starch in corn (*zea mais*), I think is somewhat overrated. Gorham gives 77 per cent., Vauquelin 75 per cent. of dry corn, Bizio gives 80.9 parts in 102 of corn in his analysis; but no statement of water. Now corn from the field contains 26 per cent. of water, air dried corn generally used in a distillery contains 13 per cent. According to Liebig corn contains 4.25 to 4.66 per cent. of oil; by Dumas and others 6 per cent. The oil can be plainly observed by putting a grain lengthways, taking out the lower center part and pressing it between the nails of the two thumbs. I think that from 38 to 40 per cent. of starch in one bushel of (56 pounds) corn, might produce from 19 to 20 quarts of proof spirits. This quantity only, I obtained by treating corn and cobs together with sulphuric acid. Late experiments have shown that by the influence of malt or diastase only ⅓ of starch is transformed into sugar and ⅔ of it into dextrine; but through the action of yeast and gluten during the fermenting process, another part of dextrine is tranformed into sugar and from this into alcohol. By the application of malt alone as the brewers use the same for making beer, the process of saccharification is checked when ⅓ sugar is formed. The wort before fermentation contains ⅓ sugar and ⅔ dextrine in solution. When it has fermented the proceeds of ⅓ of sugar (partly transformed into alcohol) and ⅔ of dextrine constitute the beer. T. A. HOFFMANN, Chemist.

Beardstown, Ill., April 28, 1863.

Welding Steel.

MESSRS. EDITORS:—I have noticed that when cast steel is welded, it invariably shows a different appearance at the weld, it being more like iron than steel. The question to me arises, can steel be welded? It is reasonable to suppose that if it has a different appearance at the weld, it must be either improved by the process or injured—most likely the latter. It seems probable to me that in welding the surfaces are decarbonized or reduced to iron, and are not united as pure solid steel, but with a film of iron between. I have had some experience in working cast steel, having fitted up nearly all the boring tools used at the Fort Pitt Cannon Foundry for the last two years and a half. I also notice that where there is a weld in a tool it does not harden as well at that point as the rest of the steel, and when the heavy "bottom tools" have to be dressed over, they frequently part at the weld, thus showing that they are not as strong at that point as solid steel.

I would suggest as a reason for the "series of loud reports inside of a boiler" (observed by your correspondent in Philadelphia, Mr. E. Brown), that a portion of the steam is condensed by contact with the cold water from the pump, forming a sudden vacuum, the result of which would naturally be a report like that described. C. W. CRAWFORD.

Fort Pitt Works, Pittsburgh, Pa., May 11, 1863.

Explosion of a Powder Magazine.

A tremendous explosion took place in this city on Monday, the 12th inst., at half past eleven P.M., causing the destruction of the cartridge factory at the foot of Seventy-ninth street, East River. There were (says a daily paper) 140 barrels of blasting powder and 20 barrels of gunpowder stored on the premises, all of which was ignited and destroyed. There were at one time over one million of ball-cartridges in the building, but fortunately the proprietors had shipped them off before the accident occurred. The shock of the explosion was felt for miles around. In New Haven, 78 miles from the scene of the disaster, the people imagined all sorts of things, among others that an earthquake was in progress, that distant cannonading was going on, &c. In Astoria and Ravenswood—small villages adjacent to the site of the magazine—the excitement was very great and the damage done to glass and joiner-work also considerable. The penal institutions on Blackwell's Island, directly opposite the magazine, suffered very much, as did also other tenements in the immediate vicinity. The whole amount of damage is represented as reaching $100,000, and the occurrence will long be remembered by reason of its tremendous effects. No lives were lost—a remarkable feature when we consider the quantities of bullets that were hurled far and wide.

The "Golden City."

The large new steamship of the Pacific Mail Company, the *Golden City*, is now receiving her machinery at the Novelty Iron Works. The cylinder and its attachments, the steam-chest, side pipes, cut-off, &c., are all in place, as also the circulating and air pumps, and the main shafts. The circulating pump is one of Andrews' pattern, of the same kind that was in use on the *Monitor* when she was lost, and which did such good service on that occasion. It is driven by two independent vertical engines, standing on a bedplate between the air pump and the main shafts, and is connected by suitable pipes with the condenser, which is of the surface variety—Sewall's patent. Mr. Lyman Hall is erecting the engine, and from the vigor with which he is prosecuting the work, his part of the ship (the machinery) will be ready for sea before many weeks. Mr. Hall is familiar with all branches of his business, and erected the engine of the *Constitution*, which performed so well while in the Government service as a transport. The engine of the *Golden City* has a cylinder of 105 inches in diameter, by 12 feet stroke; the *Sacramento*, consort, has an engine whose cylinder is 5 inches less in diameter by the same stroke.

SCIENTIFIC BOOKS.—There is a growing interest among our mechanics for scientific publications, which we are much pleased to notice, and we recommend all who wish to purchase works of this class to send to Henry Carey Baird, of Philadelphia, Pa., for one of his catalogues. Mr. Baird is a reliable publisher and his catalogue embraces some of the best books extant.

FOREIGN IRON CLADS.—The cost of the British iron-clad ships has been enormous. The *Black Prince* cost £373,899; *Resistance*, £257,848; the *Defence*, £252,898. The whole cost of the *Warrior*, before being made ready for sea, was £377,373. Contrast these figures with those of the *Monitors*, about $350,000, and the comparative efficiency of the two classes of ships—the English vessels with their towering bulk, and our own with their submerged hulls, and we need not indulge in much conjecture as to which of the two would come out the victor in a contest.

THE largest railway carriage factory in the world is said to be at Berlin, Prussia; it employs 1,500 men and turns out carriages to the value of nearly $1,500,000 per annum.

THE receipts of grain at Buffalo, N. Y., on the 11th and 12th inst., amounted to 2,180,000 bushels—the greatest quantity ever received in the same space of time at that point.

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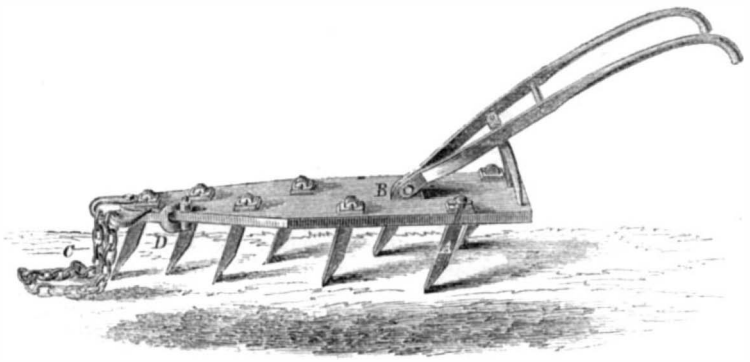
Improved Ditching Machine.

The invention herewith illustrated is intended for a subsoiling and ditching machine, and consists of the steel teeth, A, secured in the frame, B; these teeth have square shoulders below the frame, and are fastened in their places by keys or their equivalent, on top of it. They are so disposed in the frame as to make a wide thoroughly-drilled track or furrow, equal in width to the lateral distance between the teeth on the opposite sides of the frame, and not a number of narrow single drills or furrows. The team, either single or double, as circumstances require, is attached to the draught chain, C; when a side draught is desirable the chain is detached from the central hook and connected with the clevis, D, and the direction of the apparatus is controlled by the laborer from the plow-handles. The whole machine is only four feet long, and weighs about 270 pounds. The teeth are about 12 inches long below the plate.

The inventor says that this implement is used in subsoiling by following in the furrow of a common plow. It loosens the ground 12 inches deep and wide, and leaves it finely pulverized. In the work performed, the inventor states that it is far superior to any similar machine, and is much easier for a team. In ditching it will loosen the soil or hardpan, and in one day it will perform more work than fifty men could in the same time. This invention was patented on March 31, 1863; for further information apply to the inventor, W. D. Strowger, Oswego, N. Y. (where the machine can be seen in operation), or to Eben Mason, 101 Water street, New York.



STROWGER'S PATENT DITCHING MACHINE.

Naval On-dit.

The Navy Department has received the following proposals from responsible ship-builders for the construction of the new ocean iron-clad navy. The plans, however, will not be ready for months to come, and some three years will have to elapse before the vessels can be fit for use, thus rendering it certain that 1866 will come before the formidable craft can be ready for service. Although the bids were to close on the 13th of April they are still open, and will be so for some days. The parties who are willing to build are:—Messrs. Merritt & Sons, Philadelphia, one vessel; Archibald and Reany, Chester, one vessel; Thomas F. Rowland, Greenpoint, one vessel; Romeo Underhill, New York, one vessel; the Atlantic Works, Boston, one or two vessels; H. M. Figaro, Philadelphia, one vessel. A Mr. Tufts offered to build one on his own plan. The price put in for these vessels ranges from four millions one hundred thousand to four millions four hundred thousand dollars; the estimate of Mr. Underhill, of New York, being the highest. If ten of these vessels were built, at two and a quarter millions each, they would cost nearly a year's navy estimate—over sixty millions—before their armament and general wants could be supplied. The dimensions of this fleet proposed for will be greater than those of any iron-clad yet conceived. It was learned in the engagement with the Charleston forts and that with Fort McAllister that the chief danger caused to the *Monitors* in both those fights arose from the bolts, which secured the iron plates, being driven inward by the force of the impact, thus occasioning the serious wounding of the inmates. Aside from these defects the *Monitors* have been proved invulnerable to the heaviest metal yet thrown against them. The remedy for this defect has already been discovered, is patented, and has received the approval of many scientific men. Mr. Maxmilian Wappich is the inventor of a method of fastening iron plates upon vessels, turrets or forts, by a process which entirely obviates the use of bolts extending through the outer plate of the armor. Each corner of the outside plate is turned at an acute angle, and forms a bolt of length sufficient to extend to the interior of the vessel or turret, where it is secured by a key. In the center of the plate are two similar bolts, which secure the middle of the plate. The iron forming the inner sheathing is secured by means of those bolts, and thus the external surface is unbroken and not weakened by bolt holes. The joints of the plate are made to fit perfectly, and when all are keyed together, the union is more perfect and stronger than could be effected by riveted bolts.—*Philadelphia Inquirer.*

Photographic Paper at High Altitudes.

Mr. Glaisher and Mr. Cox, aeronauts, made another ascent lately in England, reaching the hight of four miles and a half. They were nearly carried out to sea, and only saved themselves by a rapid descent—falling the last two miles in four minutes. The most curious fact elicited by this ascent is, that the action of the sun's rays upon "sensitized" photographic paper is much less at great altitudes than near the earth's surface! Mr. Glaisher took with him slips of such paper, and arranged that similar slips should be exposed at Greenwich Observatory, and the amount of coloration noted simultaneously every five minutes. The report tells that the paper in the balloon was exposed to the full rays of the sun, with this extraordinary result—that, at three miles high, the paper did not color so much in half an hour as in the grounds of the Royal Observatory in one minute! This would seem to indicate that the chemical effects of light are largely due to its passage through the atmosphere, or at least to the density of the atmosphere through which it has recently passed.

MISCELLANEOUS SUMMARY.

THE New Orleans *Picayune* states that 14,151 sacks of rice were sent from Plaquemine parish to New Orleans in 1862 and 1863, against 13,864 in 1861 and 1862. A sack holds 100 pounds of clean rice. A bushel weighs from 45 to 58 pounds of clean rice. The weight of a barrel of rough rice is 160 pounds. An acre of land planted with rice, on a general average, yields about fifteen barrels of rough rice. Two barrels of rough rice make one barrel of clean rice, weighing 200 pounds, net. For the last three or four months the consumption of creole rice in New Orleans has averaged 500 sacks per week. April prices—6½ @ 8c. for No. 1; 5½ @ 6c. for No. 2; and 2½ @ 3c. for No. 3.

WE learn from the *Mining Gazette* (Houghton, L. S.) that several rich lodes of copper have recently been discovered in the Portage district. The editor says: "At every point where it has been uncovered, the rock broken out is well filled with shot copper, and in fragments of the outcrop pieces of barrel-work weighing ten and twenty-five pounds have been found. Experienced men, who examined the vein, pronounced it the richest show they have ever seen in the district, not even excepting the splendid appearance of the Pewabic lode, when first opened."

THE St. Louis *Republican* states, as one of the facts illustrating the magnitude of the war, that 31,184 horses and 19,727 mules were purchased in that city for the army during the year ending March 31, 1863; they cost $5,911,000. Most of the animals were brought from Illinois and the northern parts of Indiana and Ohio; Missouri having been exhausted early in the commencement of the rebellion.

THE gunboat *Penobscot*, Commander De Haven, is now nearly ready for sea again. The propeller of the *Penobscot*, as with some others of her class, has proved too small for her engines. The fact that her fires were out less than ten times, and that her screw made five millions six hundred thousand revolutions, shows the exhausting wear and tear to which our blockaders are subject by the nature of the service.

COUNTING CHICKENS BEFORE THEY ARE HATCHED.—The Charleston *Courier* is in trouble as to how Charleston can get lumber to rebuild the Palmetto city. The Confederate Government must monopolize all the railroads for many months after peace is declared and independence secured, to get cotton to the seaboard, to send to Europe to pay Confederate loans, says this learned scribe, and in the meantime Charleston must suffer for the want of lumber. If Charleston is not to be rebuilt till the independence of the Southern Confederacy is established, the *Courier* man need not worry about lumber.—*Sunday Dispatch.*

SEVERAL more of those machines for removing torpedoes in channel-ways have been despatched South, and Commodore Dupont has now the means at hand for destroying the torpedoes. The length of each machine is about fifty feet.

INCREMATION.—The human body is, in general, so little prone to combustion, that it requires a very considerable time, with even an abundant supply of fuel, to reduce it to ashes. Dr. Christison (the eminent medical jurist) states that the quantity of wood required to burn the body of an adult is about two cart-loads. The last man burned at the stake in Europe (except one in Spain) was in Normandy, and it required two large cart-loads of faggots, and several hours to effect complete combustion. Among the Romans, so much wood was required to consume a body, that it was too expensive a mode of disposing of the dead to be adopted by the common people.

"WE learn from an Eastern exchange that ten thousand cows are required to supply Boston with milk;" so says the *Sunday Atlas*, which also facetiously remarks: "The number of hydrants required to furnish New York with the same material does not seem to be mentioned."

THE Lynchburgh *Virginian*, commenting upon the statement that tenpenny nails are passing as currency at five cents each in the upper part of North Carolina, remarks: "We have no such metallic basis for our currency here. Our circulating mediums are grains of corn, representing five cents, and quids of tobacco, representing the decimals."

ABOUT 20,000 dozens of spools of "ivory-finished" spool-thread are manufactured weekly by Green & Daniels, Pawtucket, R. I. Their numbers range from 16 to 100. All the fine numbers above 60 are made from Sea Island cotton.

Maple Sugar.

We recently questioned the legality of selling maple sugar as confectionary and taxing it as a necessary article. We find the following item in reference to this subject from the Revenue Office:—

TREAS'Y DEPT., OFFICE INTERNAL REVENUE,
WASHINGTON, April 11, 1863,

The production of maple sugar is a manufacture, and liable to a duty of three per cent *ad valorem*. Maple sugar, when compounded with other sugars or wrought into confectionary, is liable to the same tax as is imposed by the amendment to Section 75 (see Act of March 3d) upon other confectionary. EDWARD MCPHERSON.
Deputy Commissioner.

COMPLIMENT TO MR. ALBAN C. STIMERS.—Mr. Alban C. Stimers, the naval engineer who was in charge of the *Monitor* at the time of her memorable attack on the rebel steamer *Merrimac*, has been presented with a service of silver in consideration of his efforts on that occasion, by some of the principal men of this city. Many prominent names in the community were subscribed to the fund; among them we notice Wm. H. Aspinwall, John Ericsson, Howard Potter, and others. Mr. Stimers responded to the compliment in a brief note, expressing himself as highly flattered and pleased by the compliment.

THE WATERBURY BRASS MILLS.—We have recently made the tour of some of the principal brass-working manufactories in Waterbury, Conn., and shall devote a considerable portion of our space, for some time to come, to the various branches of the business, and the operations by which buttons, lamp-burners, metallic business cards, percussion caps, thimbles, &c., are produced. These articles will be found to contain popular information and will repay perusal.

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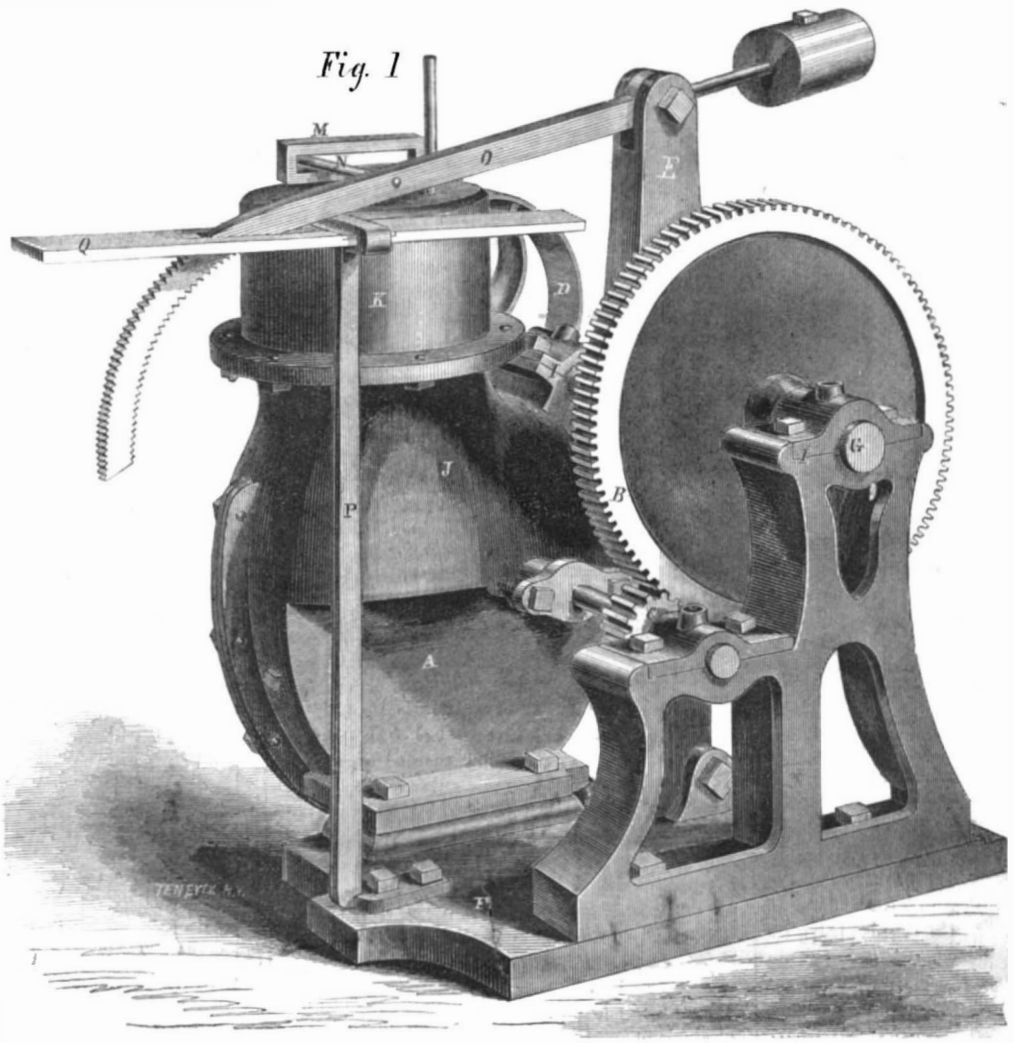
Improved Patent Governor.

Since the days of Watt up to the present time inventors have sought, and are still seeking, for an apparatus which shall effectually control the movements of the steam engine or water wheel. A machine at once complete and simple in all its parts, is the first requisite. The number of such appliances is almost countless; the field for invention is still open, and chances exists for further improvement. No matter how good a governor may be, some other inventor thinks he can devise a better one, and it is owing to this very spirit that so many improvements have been made. The governor herewith illustrated is, we are informed, an extremely efficient one; and is of that class wherein a piston is balanced by a column of liquid, either oil or water; and the changes caused by the unequal supply afforded it, are distributed to a suitable apparatus for increasing or diminishing the supply of steam to the cylinder.

Fig. 1 is a perspective view. The case, A, contains a fan wheel driven by the spur wheel, B, through the pinion, C. This wheel and its shaft are in turn driven by a belt passing over the pulley, D. The vibrating lever, E, is fastened at the bottom to the bedplate, F, and has a slot in the middle, through which the shaft, G, passes. On this shaft there is an eccentric, H. (See Fig. 2.) This shaft and its eccentric run in the bearings, I I. Let us now return to the case, A; the upper portion of this has a chamber, J, which communicates by a port, L, (contained inside of the casting) with the cylinder, K. This cylinder is not of the full diameter indicated by the outside diameter of the casting, but a part of the space is occupied by another port, L′, just mentioned. The slotted crosshead, M, is attached to the piston rod of the internal cylinder, and has a pin, N, working in it; said pin being fastened to the notched lever, O; the small rod on the right is simply a guide for the piston. On the bed plate is bolted the upright bar, P, having a slotted head, in which the plate, Q, also slotted, slides freely. These constitute the principal details of the machine. The operation is as follows:—The case is filled with oil until it completely surrounds the fan. Motion being transmitted to the fan through the gearing, a portion of the oil is forced up the covered passage, L, (see Fig. 2), to the piston, S, in the cylinder, K. The supply of oil to the under side of the controlling piston is, of course, limited by the speed of the fan; the fan is driven directly from the engine. It will, therefore, be apparent that when the speed of the engine decreases, that of the fan will also slacken, and the piston in the cylinder will fall. The notched lever receives a vibrating movement from the eccentric on the shaft, and as the piston falls it carries the lever down with it, while the eccentric thrusts it forward until the notches strike the slide, Q, to which the throttle valve is connected, and open the same, consequently admitting more steam to the cylinder. Should the engine run too fast, the reverse of these operations takes place, decreasing the speed of the engine. The motion of the piston in the cylinder is very free and even, and any oil that is forced past it runs through an aperture in the cylinder down the port, L′, to the receiving tank, J, again (indicated by dotted lines in Fig. 2), and is thus worked over and over. The lever is balanced by the counter-poise at the opposite end. This governor has been attached to many water wheels and steam engines, and is now working on them, giving great satisfaction.

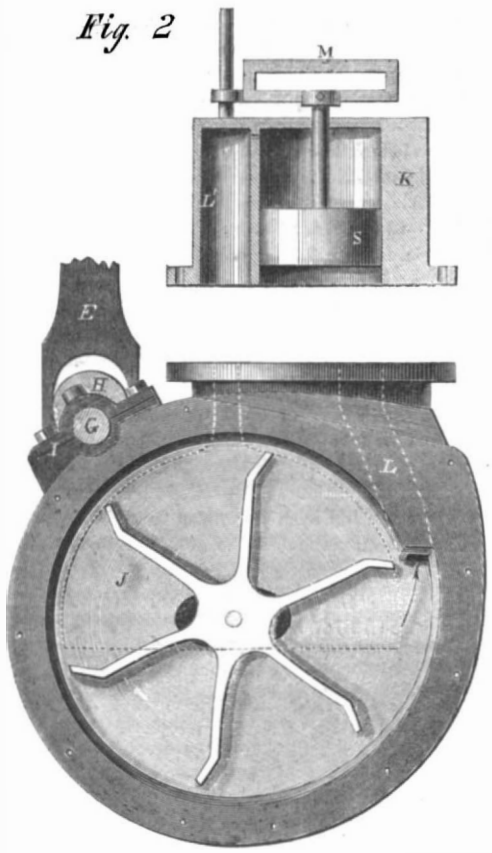
They are also much used in a large number of factories and workshops throughout the country, and the proprietor of the patent is now actively engaged in manufacturing them at Trenton, N. J. We have been assured that no complaints are heard from them. Valuable improvements have been already made in the machine, which, not being secured by patent, we have refrained from illustrating.

Fig. 1



GILLESPIE'S PATENT GOVERNOR.

Fig. 2



A patent was procured on January 7, 1862, by James E. Gillespie, of Trenton, N. J.; further information can be had by addressing him as above, or Todd & Rafferty, 13 Dey street, this city.

Gardens of Mechanics.

We want to encourage our mechanics as much as possible to cultivate small garden-spots, for the production of table vegetables; they will also find much satisfaction in the growth of some choice varieties of flowers. These two things combined give to the dwelling and the grounds adjacent a home-like appearance, besides adding to the luxuries of the table. A person in our employ, who owns a a snug place near New York, raised, last year, 76 bushels of excellent potatoes on a piece of ground measuring only just $\frac{3}{16}$ths of an acre. In addition to this useful esculent, he cultivates choice fruits and flowers; the latter in great profusion. We often find, upon reaching our desk in the morning, a fine bouquet of beautiful flowers—such as Shenstone might covet—plucked from vines and shrubs grown in his garden. In addition to the floral produce of summer culture, we are often greeted with choice bouquets in mid-winter from the same source. Our friend has a skillfully-arranged green-house attached to his dwelling, which is kept warm in winter by the waste heat from the cooking-range. It has required some years to arrange all these things—they have been done gradually, and they are now more than paying all outlays of time and money.

Prosperous Mechanics.—If we look around within the circle of our acquaintance, we shall find that many of our most respectable citizens have learned mechanical trades. Some of the first merchants of this city were once mechanics; and many of our professional men, when in their youth, belonged to the same honorable fraternity. How did they achieve success? It was by the cultivation of their minds in useful knowledge—by a proper feeling of self-respect which led them to form habits of industry and fru gality, and thus they have secured the respect and confidence of their employers and risen to affluence and high social positions. The same path of honor and usefulness is open to every mechanic in our republic, and we hope these examples will stimulate them to strive to be respected for their own worth and usefulness.

The Tycoon of Japan has sent a present to President Lincoln, consisting of a coat of mail. An umbrella-like helmet, of fabricated sheets of steel and copper, shields the head, while a vandyke of interwoven silk cord and lacquered net-work falls gracefully upon the shoulders. The outside of the helmet is profusely ornamented with chrisanthemums of gold, in beautiful open-work, upon black lacquer, with now and then a trimming of purest silver. The visor is of copper, lacquered in scarlet and brown. The armlets are of the finest copper chain work. The breastplate is of copper intersected with parallel strips of lacquer, and woven together with delicate wire and golden cord. A sort of kit accompanies the armor, and with lacquered leggins grotesquely formed completes the set.

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THEORY AND PRACTICE.

The intimate relations which exist between theory and practice are now acknowledged by all sensible men, whether professional or mechanical. Certain rude and unlettered persons, too lazy to study, incapable of mental acquisition, and envious of all others who distinguish themselves, sneer at theoretical rules and adhere blindly to the "rule of thumb" as practiced in the ancient days, when the relations between the arts and the kindred pursuits of the study were unappreciated and unapplied.

Happily, sneering and derision have no particular effect upon science itself; and those shrewd individuals who avail themselves of professional knowledge, both practical and theoretical, are far ahead of those who prefer the old way and walk blindly therein. There is, unquestionably, a great deal to be said about injudicious persons, who, pretending to a knowledge of theory, and professing to apply scientific principles to daily manufactures and inventions, fail miserably in their undertaking and draw down the scoff and jest of the illiterate, who despise learning in any shape. Their failure is no proof that science is useless, but that the way in which it was applied made it inefficient; and we assert, unqualifiedly, that theory and practice, science and actual experience, are imperatively necessary to produce finished engineers, philosophers—practical men in the fullest sense of the word. These remarks are naturally suggested by recent proceedings in the Franklin Institute, wherein it was proposed to establish, under Government auspices, a "National Academy of Sciences," which should embrace the practical details of the machine-shop within its walls, and, in fact, be a combination of all the desirable features embraced in modern mechanics.

It was not directly stated, we think (for the paragraph referring to the subject has been mislaid), that the students so educated should be held amenable to the orders of the Government in time of war. Such would naturally be the inference, even if the fact was not explicitly set forth, or within the purview of the contemplated academy. The establishment at West Point has bred a great many able engineers and —if the profession will pardon the connection—innumerable traitors also, and the mischief that these wretches have wrought the Government is and will be apparent for many a long year to come. That an academy of the natural sciences would be a very great desideratum and an important advantage to the resources of the country no one can doubt, but we do not desire to see it under Government protection. Politics in the abstract blight every educational influence they come in contact with, solely because they use the ambitions and bad passions of men to advance personal interests. Science is simple and unassuming in manner, and cannot stand before bluster and pretence. Had not the Government furnished the means for its own destruction, had not the academy at West Point and the naval school at Annapolis brought forth so many rascals recreant to their trust, we should not now have reached this climax in our history.

It is urged, as a cogent argument for the establishment of such an academy as the one proposed, that engineers in good practice commit egregrious errors; and though the position is not taken, it must be inferred that, under Government auspices, hereafter all blunders would cease. We do not regard this as sustained by fact; it appears to us fallacious reasoning. The proportion of mistakes in actual practice is very small, and an error of judgment cannot justly be called a blunder. A general may fight a battle to the best of his judgment, and yet lose it, and so any professional person in the mechanic arts man through a complication of causes which the public are not always permitted to know, commit apparent inaccuracies which result unhappily to him. Must we infer that, under Government patronage, the character and quality of human nature would improve, and that the old copy, "to err is human," would be dismissed from the catalogue of mortal frailties?

As remarked previously in this article, such an institution as the one proposed would doubtless subserve good ends, and result beneficially to the country at large, but not under this Administration or any other. Individual enterprise and private benevolence must supply the means necessary for so important an institution, and no one can certainly win the gratitude of posterity in a more substantial way than by endowing such an academy with funds to enter upon its career.

THE BROADWAY RAILROAD.

For sometime past a combination of as unscrupulous men as ever existed have been steadily at work in endeavoring to procure from the Legislature of this State the right to lay down a rail track through Broadway in this city. It is well understood that the most dishonorable means have been resorted to, in order to obtain this grant. The schemers have operated upon the principle that "every man has his price;" and by the vigilant exercise of all the arts known to them, they succeeded in getting the grant from the Legislature, denying to the city all consideration for a franchise worth millions of money. Responsible real-estate owners in this city, whose property was most affected by the railway, offered two millions of dollars for the grant; but, inasmuch as none of it as to go into the pockets of the scamps in the Legislature, their proposition met no favor. The Legislature adjourned after perpetrating this outrage; and all that was wanted to complete the transaction was simply the signature of His Excellency, Gov. Seymour. The case was argued before him with skill and ability; but, to his praise be it said, he could not be moved to sign the bill; his veto is an admirable document, and fully shows that he is proof against the arts and wiles of those unscrupulous speculators. It appears probable that Broadway is to have a railroad; but there is much satisfaction in the fact that the Albany jobbers are not to have a hand in the spoils. In the year 1832—at the time the Legislature granted a charter to the Harlem Railroad Company to lay its track in the Fourth Avenue, Bowery and Center street—provision was made in the charter to allow this company to lay a track in other streets of the city whenever the Common Council should think proper to allow it. The municipal authorities have recently granted this right to the Harlem Company, and the work of tearing up the pavement of Broadway has commenced; but the work is temporarily suspended by an injunction issued by Judge Barbour of the Superior Court. We think, however, that the injunction will soon be dissolved, and the track laid. The company is to pay the city ten per cent of the receipts of the road below Fourteenth street, which will amount to a large sum. The scheme before the Legislature gave to the city no advantages whatever —the cormorants wanted all for themselves; and we rejoice, in common with good citizens generally, that they have failed. We trust, now, that the city authorities will see to it that the Harlem Company be compelled to lay down and equip a road that shall present as perfect a system as possible; their present road is one of the worst in the city, not only as regards the track itself, but also in respect the cars. The rail is of an old antiquated pattern, and is dangerous to passing vehicles, while the cars are miserably arranged for comfort and are wholly destitute of ventilating apparatus. In stormy weather, when the cars are overcrowded, the atmosphere is about as murky as it is in the the hold of a ship. A railroad in Broadway ought to be an ornament to the street; but, judging from what we have seen in Union Square, where the Harlem Company have commenced the work of tearing up the roadway preparatory to laying down a track, it promises to be an eyesore—a disgrace to the city and also (if possible) to the company. We suppose the company intends to lay down the track as rapidly as possible; and then turn on their old, yellow, faded-out cars to accommodate the traffic. These vehicles are tolerably well adapted to run down past the "Tombs" in Center street, and in front of lager-bier shops and brothels, as it does; but not one of them ought to be allowed to traverse Broadway, unless during the small hours past mid-night, when the majority of honest people are in bed. We urgently call on our city authorities to carefully watch the Harlem Railroad Company's proceedings in this matter, and to compel it to build and equip a line which shall be in every respect a model city-railway.

SEA FOGS AND SIGNALS.

Sea fogs are exceedingly dangerous to shipping, especially near coasts like those on the Northeast part of our continent. A few weeks ago the steamer *Anglo-Saxon* was wrecked near Cape Race by striking upon a rock during a fog, and this was but one of many similar accidents which have occnrred in such situations and under like circumstances. A sea fog is simply a cloud resting upon the face of the waters, and usually it does not extend to a very great elevation. It consists of moisture evaporated from the water, becoming condensed near the surface of the sea by the cold air of the upper atmosphere. When standing upon a high elevation, fogs may frequently be seen extending like white sheets over low grounds, along river courses and upon the face of bays, while all above is quite clear. Fogs differ in density, and they are dangerous just in proportion to their density. When a red light cannot be recognized at a distance of over one hundred yards, seamen consider them to be very dangerous. As no art of man can prevent their occurrence, all that can be done, as a preventive of accidents on much frequented sea-coasts, is the employment of the best signals to give warning of danger to vessels. To obviate collisions between vessels sailing in a fog, sounds are employed. Steamers use steam whistles; and sailing vessels, bells. But the danger of a fog not only consists in its impenetrable nature to the rays of light, but also in its acting like a cushion to prevent the vibration of sound-waves. As fogs are very irregular, the waves of sound are frequently so deflected, that they appear to proceed from a different direction than the place from whence they are propagated. Sounds are also deceptive in fogs by sometimes seeming to come from a much greater distance than their source. And yet, although, sound-signals are very uncertain, in such circumstances they are really the only kind that can, with any degree of safety, be relied upon; the great question connected with them is to employ the best agency that will transmit them to the greatest distance and in the most direct line from their source. Now it is not volume, but intensity, of sound which is transmitted to the greatest distance, and musical sounds of high degree are the best to employ. In the harbor of Boulogne, France, a fog-bell is placed on the end of a pier and in the center of a large parabolic reflector facing the sea, and its sounds are conveyed outwards in a very direct line to a great distance. On land such signals appear to be the best, but on vessels sailing in a fog, the reflector would be a disadvantage, because the waves of sound in such cases should radiate in all directions. A steam whistle is employed at Partridge Island, near St. John's, New Brunswick; and Daboll's air whistle is used on the dangerous stations of our New England coasts. This latter is an excellent and simple fog signal, but it appears to us that it would be much improved if it were so constructed as to transmit several musical notes, like those of the calliope. By employing a parabolic reflector to concentrate musical sounds of a high degree of intensity with air or steam whistles, perhaps the most perfect fog signal yet tried would thus be secured.

PRINCESS ALEXANDRA was married in a lace dress which cost £8,000! The same night hundreds of poor girls were starving in London.

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CHANGES IN THE IRON-CLADS.

It will be a gratification to those members of the press who are in the habit of thundering their indignation at the lack of enterprise on the part of the Government, to learn that the recent experience before Fort Sumter has been valuable to us, inasmuch steps are being taken to rebuild certain portions of the iron-clads now on the stocks and afloat. The 11-inch turrets of the *Roanoke* are to be clothed with three additional inches of iron, in (as we are informed) solid plates. A space is left between the original turret and the addition thereto, which is to be filled with some fibrous substance; the particular value of this last feature is not apparent. The *Roanoke's* sides are clad with 4½-inch iron on the old hull; whether this thickness of iron is sufficient to be comparatively invulnerable is extremely questionable. The query suggests itself that if 11 inches of iron, disposed in the strongest manner to resist assault, are insufficient, what will become of 4½ inches of iron on plane surfaces? The *Mound City*, so says the telegraph, received a shot through her 2½-inch solid plating, which passed through both sides of the vessel, in all five inches of iron. We do not learn that any change is to be made in her construction.

The *Onondaga* at Greenpoint, N. Y., the battery built by Mr. Rowland for the contractor, Mr. George Quintard of the Morgan Iron Works, is undergoing very important changes in her plan and construction. This vessel had an armament of 4½-inch iron plates fastened directly to an iron hull without wooden backing of any kind. It is now intended to place 12 inches of wood over the 4½-inch plating, and to line this wood on the outboard side with a plate 1-inch thick. The wood will be of oak; 9 inches of it will be laid with the grain at right angles with the ships length, and the additional 3 inches will consist of planking. The turrets (*Monitor* plan) are also undergoing a change, so we are informed; and it is thought that these improvements will add materially to the effectiveness of the ship. No through bolts will be used in fastening on the wooden facing of the *Onondaga*, but the armor will be suspended, as it were, from the deck. This plan has also been recommended for the turrets of the *Monitor* batteries.

It is also said that a partial revolution has been effected in the Ordnance Bureau of the Navy Department, in consequence of the failure of the attack on Charleston, and new instructions have been issued respecting the armament of the iron-clads, not only of those at Port Royal but of those now building, and also respecting naval ordnance generally. "The Dahlgren guns are to be removed and an entirely new style of 13-inch gun, using seventy-five pounds of powder at a load, is to be substituted; this is to be done before the attack on Charleston is renewed. Fort Sumter may be effectively bombarded at a much greater distance by the new guns than by those of the Dahlgren pattern. The new guns are now in process of construction, but it is believed several weeks will elapse before they can be put into a sufficient number of *Monitors* to permit a renewal of the attack on Charleston."

We do not give these latter items credit; the former—concerning the changes in the construction of the iron-clads—we know to be correct. It is at all events an encouraging sign to see the Government at last waking up and taking a step in the right direction.

PAINT FOR IRON SHIPS.

Steamships composed mostly of iron, and covered merely with iron plating on wood, are fast superseding entire wooden vessels for mercantile and war purposes. But iron vessels are defective in one important point. When in service for a comparatively short period of time, their bottoms become covered with weeds and barnacles to such an extent as to cause great resistance to their progress through the water, and a considerable loss in their speed is the consequence; this amounts to about one mile per hour, during every month they are in service, hence they require to be frequently put into dock for the purpose of cleaning and painting them. It is stated by men of experience in such matters, that when iron vessels enter warm-fresh-water rivers, all the shell-fish which may have been adhering to them drop off and their bottoms become quite clean. But as most shipping ports are situated in bays of salt water, this fact affords no great comfort to the proprietors of iron ships. The great object for such vessels has been to obtain some composition, like a paint, which, when applied to them, would exert no chemical action upon the metal, and yet would be as effectual as copper sheathing on wooden vessels, in keeping the bottoms free from shell-fish and seaweed. At the bad is the common paint used for iron steamers, but it is not a very efficient protective, and many other paints and compositions have been tried, but hitherto with no very gratifying success, so far as we know. A composition has at last been discovered, which, it is said, answers all the requirements. At the general meeting of the Institute of Naval Architects, lately held in London, W J. Hay, professor of chemistry in the Royal Naval College, Portsmouth, England, described the paint, and related that it had been tried with other composi tions since 1857. It consists of the oxide of copper boiled in linseed oil. A sub-oxide of copper is roasted until it has absorbed sufficient oxygen to become black oxide; then it is reduced to powder and boiled in linseed oil until it assumes a puce color. It should be of moderate thickness when applied. The armor-clad frigate, *Warrior*, was coated with this paint, and after she had been nine months in service, Professor Hay stated that, when docked, no signs of oxidation were obserable in her plating, and her bottom was comparatively clean.

THE MANUFACTURE OF CARRIAGES.

Within the past few years the manufacture of fine carriages has become one of our greatest industries. At New Haven and Bridgeport (Conn.), Newark (N. J.), and in this city there are large carriage factories, employing in the aggregate thousands of men. With a desire to lay before our readers some knowledge of the extent of mechanical details of this branch of business, we have recently visited some of the largest establishments in this city, and were somewhat surprised to find how little of the work, comparatively, is done by machinery. In the large factory of Messrs. Brewster & Co., on the corner of Broome and Mott streets, 225 men are constantly employed in turning out carriages of every style and description, from the light trotting buggy of the sportsman, to the elegant brougham for the Central Park. Most of the work is done by hand, it being found impracticable to employ machinery to any great extent, as the styles change so continually, and the quantity of work of a stipulated kind is so small that the automatic exactness with which tools reproduce patterns is of no avail. In managing such a business the proprietors naturally seek out that system which is best adapted to produce the most perfect and uniform style of work. All the foremen in the workshops of Messrs. Brewster & Co. are given, in addition to their regular salaries, an interest in the business, and the amount of profit they derive depends entirely upon the fidelity and business talent which they display. The artisans also work by the piece, and their earnings depend upon the skill they evince. Each man who makes a wheel or other part of the vehicle puts his mark upon it, and if it fails through any defect of his workmanship, the job is returned to him to be repaired. It will thus be seen that each man is his own "boss," and has every incentive to do his best.

Of late years a large foreign trade in carriages has sprung up in this country, principally with Prussia and other portions of Germany, and in our own country the popular taste as well as the demand has greatly improved within the past few years. The upholstering and leather work of carriages is now very thoroughly done, and we are informed that in the article of enameled leather our American manufacturers are fast excelling all foreign competitors.

One fact in regard to Messrs. Brewster's carriages is worthy of mention. This firm sent a large number of their carriages to the Great Exhibition in London, last year, and the leather work was especially admired; all the iron work about the dasher being neatly covered, was much commented upon. At the close of the Exhibition all the leather work was cut and slashed with knives by envious Britons, who declared that it was machine work, and, consequently, not entitled to any consideration. This very fraternal demonstration was, no doubt, satisfying to the perpetrators, yet its effect has not been to stop the business.

VALUABLE RECEIPTS.

HARD CEMENTS.—The following cement has been used with success in covering terraces, lining cisterns and uniting stone flagging:—Take 90 parts by weight of well-burned brick reduced to powder, and 7 parts of litharge, mix them together and render them plastic with linseed oil. It is then applied in the manner of plaster; the body that is to be covered being always previously wetted on the outside with a sponge. When the cement is extended over a large surface it sometimes dries with flaws in it, which must be filled up with a fresh quantity. In three or four days it becomes firm.

TURKISH CEMENTS.—The Turks use common red earthenware pipes with socket-joints, to convey water from springs to reservoirs and fountains. They make and use mortar and cement as follows:—*Mortar.*—Fresh-slacked hydraulic lime, one part, by measure; chopped tow sufficient to mix into the consistency of ordinary hair mortar. The ingredients are mixed dry, then well incorporated by the aid of water; this mortar is used fresh. *Cement.*—Fresh-slacked hydraulic lime, one part by measure; pounded brick finely sifted, half a part by measure; chopped tow as above. The whole is mixed with oil, in place of water. The earthenware pipe-joints are made water-tight with this cement.

PLASTIC MATERIAL FOR DECORATIVE ORNAMENTS.—Take five parts of good whiting and mix with a solution of one part of glue. When the whiting is worked up into a paste with the glue, a proportionate amount of turpentine is added. In order to prevent its clinging to the hands whilst the turpentine is being worked into the paste, a small quantity of linseed oil is added from time to time. The mass may also be colored by kneading any pigment that may be desired. It may be pressed into molds, and used for the production of bas-reliefs, &c. It may also be worked by hand into models for sculptors and architects, during which operation the hands must be rubbed with linseed oil; the mass must be kept warm during the process. When it cools and dries (which takes place in a few hours) it becomes hard.

THE PATENT OFFICE REPORT FOR 1861.

In consequence of the suspension of the project for printing the patents in full, under the law of 1861, it became necessary to resume the publication of the yearly volumes of Reports. The last volumes issued were for 1860. The resumption was only begun a short time ago, and the volume for 1861 is now in course of preparation. The drawings are being engraved by Messrs. E. R. Jewett & Co., of Buffalo, N. Y.; and from some proofs which we have seen, we can say that they will be splendidly executed. If all the contractors for Government work would manifest but a tithe of the fidelity that is shown by the official labors of the above-named artists, the people would indeed be fortunate.

Enterprising Thieves.

There is a bad set of fellows about the Brooklyn Navy Yard. Not content with stealing $30,000, some time ago, from a paymaster there, some thieves actually carried off the safe from one of the gunboats. We expect to hear shortly of the freebooters' entry to the machine-shop and of the mysterious disappearance of the 100-horse engine therein or a lathe or two. The matter is becoming serious. A watchman inspected the operation of carrying off the safe and innocently supposed it to be "all right." Sagacious watchman! We suggest that a strict guard be kept over the receiving-ship, *North Carolina*, lest some person or persons take a fancy to her and the nation be deprived of her valuable services.

AT Black Creek (Canada West) oil region a sublime spectacle was lately witnessed. The creek had got obstructed, and the oil collecting on its surface was set on fire, wnen immediately the whole creek was in a flame, catching the trees upon its banks and doing much damage. For rods, it is stated, the creek appeared as a boiling cauldron, darting sheets of red flame high in the air to an altitude of nearly fifty feet.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from he United States Patent Office last week. The claims may be found in the official list.

Canal Propeller.—The object of this invention is to obtain a propeller adapted for canal navigation, which, besides possessing other advantages, shall be free from the principal objection to the screw propellers heretofore employed, namely, that of requiring the after-part of the boat to be of such lean form as to seriously impair its carrying capacity, and to this end it consists in the construction of a propeller with its blades arranged tangentially to circles concentric with a propeller shaft placed parallel with the length of the vessel and in its center, such blades being attached to a hub or disk in such a manner as to prevent the water from entering the propeller from the interior, that is to say, except by passing in an inward direction from between the outer edges of the blades, and to compel the discharge at the inner edges of the blades ; it also consists in the combination with such tangentially arranged series of blades, of a conical surface, arranged concentrically within them, for the purpose of directing the water which is discharged from the center of the wheel, directly astern of the vessel. J. B. Root, of Brooklyn, N. Y., is the inventor of this improvement.

Ventilating Damper.—This invention relates to an improvement in that class of dampers for stoves, heaters, &c., which have ventilators combined with them in such a manner as to operate in conjunction with the damper to regulate the fire and at the same time afford a perfect means for ventilation. The object of the invention is to obtain a device for the purpose specified, which may be very economically constructed and operate in the most efficient manner. To this end the invention consists in having both the damper and regulator constructed on the slide-register principle, that is to say, with a perforated or slotted part sliding or working over a stationary perforated or slotted part. N. A. Boynton, of No. 60 Canal street, New York city, is the inventor of this damper.

Sewing Machine.—This invention consists in certain novel devices for extending the loops of the upper or needle thread on the under side or back of the cloth or other material to be sewed and carrying the under or locking thread through them. Also in a novel mode of combining the needle-operating lever with the said devices for extending the loops of the eedle thread, and carrying the locking thread through them, whereby the operation of the said device is produced by the same crank or its equivalent, by which the movement of the needle-operating lever is produced. Also in a novel construction and arrangement of the feeding apparatus for feeding the cloth or other material in all directions, and in a novel mode of applying the needle in combination with such feeding apparatus to keep the planes of revolution of the feed wheel always at the same distance from the line of motion of the needle. F. W. Grote, corner Thirty-sixth street and Tenth avenue, New York city, is the inventor of this sewing machine.

Apparatus for Filtering Water.—The object of this invention is to obtain an apparatus for purifying or filtering water, which will operate continuously and be self-cleaning, and adapted for operation on a large scale for manufacturing purposes, such as the manufacture of paper and other articles in which a large quantity of pure water is required. To this end the invention consists, substantially, in the employment of an endless apron of felt or other fibrous material passing around a wheel, the periphery of which is formed of parallel rods placed a suitable distance apart, said wheel being placed in a box or reservoir of water, and the apron driven by a water wheel and cleaned by a revolving brush, the water passing through the apron into the wheel and discharged from the ends of the latter. D. N. Denman, of Milburn, N. J., is the inventor of this improvement.

Mode of controlling the launching of Vessels.—This invention has been more especially designed with a view to controlling the launching of iron war-vessels which, by reason of their great weight, require to have the blocks supporting their permanent launching ways so close together that the men who remove the blocks from under the keel preparatory to the launch, cannot escape at the sides of the ways, but have to go all the way to the lower end before they can get out. It is also applicable to controlling the launching of other vessels. It consists in fitting the lower or permanent ways just below their faces with a transversely-arranged horizontal shaft provided with catches arranged to enter notches or mortises in the upper or sliding ways, for the purpose of holding the latter back while the blocks are being removed from under the vessel, and after they have been removed, the said shaft being operated by a lever for the purpose of withdrawing the said catches when all is ready for launching. T. F. Rowland, of Brooklyn (Greenpoint), N.Y., is the inventor of this device.

Improvement in Watches.—The object of this invention is to make watches and chronometers keep time with great exactness. The invention consists in the employment in a watch, chronometer or other time-keeper, as a substitute for the fixed stud commonly used for the support of the balance spring, of an elastic support, capable of vibrating in such a direction as to permit the spring, at each vibration of the balance, to have a movement lengthwise, or in such manner that its spires have a rotary motion. This support, is of spiral or convolute form arranged so that its spires, and those of the spring will open and close alternately at each vibration of the balance which will allow the spring to have the movement above mentioned at each vibration of the balance, by which means not only may the effects of expansion and contraction in length by heat and cold be counteracted, and the escapement be kept in beat by keeping the balance in a condition of equilibrium, and, if a curb be used, keeping the effective length from the curb-pins uniform, but its alternate vibration tends to make the opening and closing vibrations of the spring equal in time or isochronous ; and, what is more important, the impulse which the spring has lengthwise at the outer end, where it has been formerly held by the fixed stud, increases the range of motion in the balance and consequently quickens it to make up time. By thus supporting the balance spring much of the variation in a watch may be prevented without any further attempt at compensation and a lighter mainspring may be used, and hence the wear of the teeth of the wheels is very greatly reduced. H. B. James, of Trenton, N. J., is the inventor of this improvement.

Propulsion of Vessels.—This invention consists in the arrangement of one or more screw propellers, each within a stationary cylindrical casing, in combination with peculiarly-constructed chambers in front and rear, whereby a column of water, of an area equal to that of the greatest submerged section of the vessel, is discharged at the stern of the vessel by the action of the propeller or propellers, and so any tendency to the formation of a vacuum astern of the vessel, and the consequent retardation of its progress is prevented. B. T. Babbitt, of Nos. 70 and 72 Washington street, New York city, is the inventor of this improvement.

Device for upsetting Tire.—This invention consists in giving to the keys which hold the tire down upon the anvil, beveled edges so that a slight motion of the tire, in a direction transversely to said keys, has a tendency to turn them edgeways, and to bring their edges down upon the tire with increased tightness, and that, by these means, a slipping of the tire under the keys during the operation of upsetting, is entirely prevented ; it consists, also, in the employment of a tapering convex wedge or guide to go under the crook made in the tire for the purpose of assisting the operator in obtaining a uniform thickness in that part of the iron that has been or is to be upset ; it consists, further, in the employment of one or more false anvils in connection with the regular anvil of the upsetting machine, in such a manner that the surface of the said anvil can conveniently be adapted to the tire or hoops of different diameters. M. P. Larry, of Windham, Maine, is the inventor of this improvement. Address Messrs. A. and A. J. Mosher, Portland, Maine, for further information.

The ancient English "yard" was a measure of length, based upon the length of the arm of King Henry I.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 5, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

38,366.—Breech-loading Fire-arm.—Louis Albright, Ottawa, Ohio :

I claim, first, The combination of the hinged and sliding breech-plug, E E′ or E″, carrying the dog, hammer and main spring, the trigger, K, pivoted in the stationary stock, and the screw threaded and milled abutment, A′, when the said parts are constructed, arranged and operated in the manner and for the purpose specified.

Second, I claim the knife, L, projecting laterally from and flush with the forward end of the hinged plug, E E′ E″, and acting to sever and remove the butt of the cartridge by the act of closing the plug, in the manner set forth.

Third, The hinged plug, E′, having the sliding block, N, adapted to be retracted to allow the passage of the said plug, over a metallic percussion cartridge and to be closed automatically by the cocking and discharge of the hammer as and for the purpose set forth.

Fourth, The arrangement of hinged plug, E″, hammer, H″, slide, I′, wafer magazine, O, cap, R, and touch-hole, J, the whole being combined and operating together in the manner described.

Fifth, In the breech-loading arm above described, I claim the employment of the exchangeable hinged breech blocks, E E′ E″, for the use of different forms of ammunition, as explained.

38,367.—Device for Stoppering Bottles.—Antoine Andre, Chicago, Ill. :

I claim a device for stoppering bottles having in combination a screw valve, A, passage, f, channel, g, and funnel-shaped mouth-piece, C, all arranged and operating in the manner and for the purpose described.

[This invention consists in the employment of a screw valve fitting into a seat that is secured to the neck of a bottle in combination with a funnel-shaped mouth-piece, in such a manner that, by the aid of said valve, the communication between the interior of the bottle and mouth-piece can be effectually stopped, and that, on opening the valve, the contents of the bottle can conveniently be poured out, or, by the aid of the funnel-shaped mouth-piece, fresh liquid can be introduced into the bottle with ease and convenience.]

38,368.—Marine Propeller.—Benj. T. Babbitt, New York City :

I claim the combination with one or more screw propellers, of chambers, D H, constructed substantially as herein specified for the purpose set forth.

38,369.—Apparatus for curing Caoutchouc.—W. R. Bagnell, Chelsea, Mass., assignor to the Union Elastic Goods Company :

I claim constructing the curing vat with a narrow area at the level of the contained fluid and with a movable partition, operating substantially as specified.

I claim, also, combining a vitreous or other suitable rod or roll with the movable partition, and also combining such rods or rolls with the vat at its upper edges, substantially as shown.

38,370.—Ventilating Damper.—N. A. Boynton, New York City :

I claim the employment of the double-slotted flanged shell, C, in combination with the slotted projection, B, and slotted shell, A, the parts being constructed and operating together, substantially in the manner herein shown and described.

38,371.—Pipe Drainer.—Abram Brigham, Lawrence, Mass. :

I claim the cover, of the box, A, made hollow in the form of a circular tube or pipe with the under side perforated in order to distribute the condensed steam equally when it enters the drainer, in combination with wire, P, and air valve, L, substantially as described.

Second, I claim the making the valve seats with a partition, T, between them, for the purpose herein set forth.

38,372.—Window-sash Supporter.—F. P. Catlin, Hudson, Wis. :

I claim, first, The combination of the arm or lever, K, and the weight, W, inserted in the casing, as described, with the rubber or other elastic substance, R, inserted either in the sash or in the lever, K.

Second, I also claim the lever, K, and weight, W, inserted in the sash, with the rubber or other elastic substance attached to either the casing or arm, K, substantially as and for the purpose described.

38,373.—Boot and Shoe.—D. N. B. Coffin, Jr., of Woburn, Mass. :

I claim the button-laced boot and shoe, as a new article of manufacture, the distinguishing feature of which consists of the arrangement of a series of buttons and a series of holes, eyelets, loops or studs upon the different parts which are to be drawn together and secured to each other ; these buttons on the one part and holes, eyelets, loops or studs on the other, being arranged to receive a lacing, string or cord, alternating from one member of one series to one of the other, and *vice versa*, so that the unlooping of the string from one button loosens the loop upon the next, and unlooping one or more of the loops from their respective buttons, the fastening of the boot or shoe is loosened while the ends of the string remain fast, and such loops of the string may be looped on again, so refastening the boot or shoe, substantially as herein set forth.

38,374.—Tax Calculator.—C. D. Crane, Fort Wayne, Ind.:

I claim the permutation method of calculating applied to the calculation of taxes in the manner described in the specification, viz., first, by the printing of the taxes on the multiples of $100 at each per cent on a separate slip, so that the several slips may be arranged into any required series of per cents ; and, second, the arranging of the taxes on the intermediate amounts between one and one hundred dollars, including the poll tax, on a separate sheet cut with appropriate apertures, so that they may, when necessary, be added to the amounts on the slips.

38,375.—Machine-shirred Ruffles.—C. O. Crosby, New Haven, Conn. :

I claim the mechanically-shirred ruffle described, as a new article of manufacture, whether the same be double or single, or either with or without a band or binding attached thereto, substantially as herein set forth.

38,376.—Washing Machine.—G. A. Dabney, of San Jose, Cal. :

I claim the combination of the oscillating concave and rubber, when used in connection with the oblique bars, f f, connected with the rubber by the cords, g′ g′, and the rubber arranged as shown to admit of having its pressure graduated at the will of the operator, as herein set forth.

[This invention relates to an improved clothes-washing machine of that class in which an oscillating concave of rollers is used in con-

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nection with a rubber. The object of the invention is to obtain a more efficient machine of the kind than any hitherto devised, by arranging the rubber in such a manner that it may be made to operate automatically by the movement of the concave and at the same time be capable of being adjusted at the will of the operator in order to regulate the pressure on the clothes, as may be required.]

38,377.—Skirt Wire.—T. D. Day, Brooklyn, N. Y.:

I claim water-proof skirt-wire prepared substantially as described.

38,378.—Liquid Filter.—D. N. Denman, Millburn, N. J. Ante-dated Dec. 25, 1862:

I claim, first, A device for filtering water and other liquids composed of a wheel, F, fitted in a reservoir, A, and provided with an endless apron or roll, G, of felt or other fibrous material, when all are arranged in such a manner that the liquid to be filtered will pass from the reservoir through the apron or roll into the wheel, and be discharged from the ends of the latter, substantially as set forth.

Second, In combination with the reservoir, A, wheel, F, and apron or roll, G, the rotary brush cylinder, I, when used as and for the purpose set forth.

Third, The pivoted bar, J, with roller, K, attached, in combination with the apron or roll, G, wheel, F, and reservoir, A.

Fourth, The driving wheel, D, and penstock, B, when combined and arranged with the reservoir, A, wheel, F, and apron or roll, G, to operate as and for the purpose herein specified.

38,379.—Thrasher and Separator.—W. W. Dingee and A. B. Farquhar, of York, Pa.:

We claim, first, Driving the rake shaft, C, from the continuation, B, of line shaft, A.

Second, Placing the delivery hopper, F, of the fan in front of the front axle of the wagon.

Third, The combination of the feeder's platform, J, with the wagon brake, L.

Fourth, Connecting the line shafting by reversible couplings in which the shaft has a free longitudinal movement.

38,380.—Clothes-wringer.—S. F. Emerson, Seville, Ohio:

I claim the wedge, F, and thumb-screw, G, when arranged and operated as and for the purpose set forth.

38,381.—Hand Mowing Machine.—Henry Fisher, Alliance, Ohio:

I claim operating the sickle, B, through the medium of the bent lever, H, connecting rod, I, crank pulley, h, gearing, j k, and crank, l, when said sickle and its operating mechanism are used in connection with the bar, C, rollers, E F, and finger bar, A, all arranged and operated as shown, for the purpose set forth.

[This invention relates to a new and improved mowing machine designed to be operated manually and for cutting or mowing lawns.]

38,382.—Kiln for drying Grain.—Abner Greenleaf, Jr., Brooklyn, N. Y., and T. C. Vice, New Haven, Conn.:

We claim, first, The arrangement of the crocks or thimbles, E, with openings, a, the diameter of which is larger on one end than on the other, to correspond to the inside and outside diameter of the fire flues or pipes, C C′, and to be used in combination with said pipes, substantially as and for the purpose shown and described.

Second, The arrangement of the flue chamber, D, at the rear end of the kiln, A, in combination with the pipes, C C′, and furnace, B, constructed and operating as and for the purpose specified.

Third, The pipe, G, extending from the exterior of the kiln through the latter and back to the chimney, in combination with the pipes, C C′, as herein shown and described.

Fourth, The arrangement of the sieve, I, with the hopper and the platform, H, as and for the purpose herein shown and described.

[This invention relates to a grain-dryer, which has been in successful operation for some months. The various improvements will be readily understood from the claims.]

38,383.—Water Wheel.—W. L. Gregory, Amsterdam, N.Y. Ante-dated Aug. 25, 1862:

I claim the combination and arrangement of the buckets, C C′ C″ C‴, pinions, g d, chains, D f, and wheel, e, as herein shown and described.

[This invention relates to an improved water wheel of that class which are operated by the force of a current or stream, and are commonly termed current wheels. The invention consists in the employment of a series of buckets attached to vertical shafts provided at their upper ends with gears connected together and to a stationary gear by chains or equivalents, whereby the buckets, as the wheel rotates, are made to present a greater or less area to the action of the stream according to the power required, and the buckets also rendered capable of being adjusted manually when it is desired to stop the wheel so as to be in a state of equipoise and incapable of being acted upon by the current.]

38,384.—Lock.—J. L. Hall, Cincinnati, Ohio.

I claim, first, The provision of the sliding check piece or dog, E, operated in advance of the main bolt by the same key or other device which moves the latter, in combination with one or more sets of tumblers, substantially as and for the purposes set forth.

Second, In the described combination with the fast tumbler, Q, I claim the provision of the sliding check piece or dog, F, operated in advance of the main bolt by the same bit, key or other instrument which moves the said bolt, the whole being combined and operating as and for the purposes substantially as set forth.

Third, The arrangement of a hollow withdrawable hub, G, containing the operating stem, N, and supporting the series of alternate loose tumblers, I, and fast washers, J, the whole being confined to said hub by the annular cap, M, in the manner represented.

Fourth, The combination of the cap, T, shiftable stem, N, and fast tumblers, Q, to facilitate numerous and ready changes of combination, as explained.

Fifth, The fixed washers, J, gate, j, in line with the aperture, S, in the hub, G, to afford a fixed guide for the trier, as described.

38,385.—Machinery for dressing Axle Boxes.—William Hamilton, Alleghany, Pa.:

I claim facing both ends of an axle box at the same time by means of two cutters placed parallel to each other at right angles to the axis of the axle box, which is caused to revolve on its axis, the cutters being so operated as to approach each other as the box is being faced, in the same relative position to each other and to the axis of the axle, substantially as described.

The combination of cutters for facing the ends of axle boxes, placed at each end thereof and susceptible of motion toward each other while preserving a given angle of inclination to the axis of the box, with a mandrel for holding the box from its inside, capable of opening on each side of its center for the purpose of holding the axle box with its axis at the proper angle to the cutters, and yet allowing the cutters to pass beyond the point of contact of the exterior surface of the mandrel and the interior circumference of the axle box, substantially as described.

The use of an adjustable gage interposed between the two cutters for the purpose of stopping the operation of the machine, when the axle box has been faced down to the required length.

38,386.—Apparatus for evaporating Saccharine and other Liquids.—Dennis Harris, New York City:

I claim the rotating disks, E, and blast pipes, C, one or more, in combination with the pad, B, and steam under pressure, all arranged as and for the purpose set forth.

[This invention consists in the employment of rotating disks in connection with a steam chamber and blowing apparatus, all arranged in such a manner that the sirup may be boiled by steam under pressure and a rapid evaporation produced without having the temperature of the sirup sufficiently high to retard or prevent crystallization and occasion a loss in sugar.]

38,387.—Sliding-door Sheaves.—R. C. Hatfield, New York City:

I claim the application of adjusting apparatus to the bearings of sliding door sheaves, for the purpose described.

Second, I claim the construction of the wheels of sliding door sheaves with a tire or periphery composed of a muffler or sound-deadening material.

38,388.—Chimney-fastener.—R. W. Hawkins, Pittsburgh, Pa.:

I claim the use of a chimney fastener for lamps, consisting of a slide placed in the burner frame and having arms or other equivalent device for holding down the flange of the chimney on one side, and capable of being slid round toward the points or other device by which the chimney is held down on the opposite side, substantially as hereinbefore described.

38,389.—Electric Baths.—M. W. House, Cleveland, Ohio:

I claim, first, constituting the head electrode, C, the terminus of two batteries, which may receive positive, +, and negative, —, from either battery or instrument, or both of the positives or both of the negatives, thus completing a double circuit through a single electrode, while the opposite poles of the batteries, respectively, terminate in traversing electrodes upon the sides of the tub, thus completing the circuit of either or both of the batteries, or induced current or currents, through any conducting medium placed between them.

Second, I claim the traversing electrodes in combination with conductors placed along the sides of the tub, as and for the purpose specified.

Third, I claim such an arrangement of traversing electrodes, that two independent sets of currents can be worked at the same time in the same direction or in opposite directions, either longitudinally, transversely or diagonally through the conducting medium in the tub.

Fourth, I claim working a primary uninterrupted current in connection with an induced interrupted current, either or both of which may be local or general, combinedly or single, as specified.

Fifth, I claim the adjustable head electrode, when constructed and arranged so as to expand and contract their surface, as and for the purpose set forth.

38,390.—Fastenings for Ornaments on Dress.—D. B. Howell, New York City:

I claim the combination of a spring plate, A, and pins, a a, applied to a shoulder strap or other ornament, substantially as and for the purpose herein specified.

[This invention is more especially adapted for masonic or other ornaments or regalia, which are to be attached as occasion may require to an ordinary dress, but is also applicable to officers' shoulder straps or other military or naval ornaments. Its object is to provide for the convenient attachment and detachment of such articles, and to this end it consists in inserting within them plates of spring steel having attached pins or hooks which may be sprung into the garment and held therein by the elasticity of the plate.]

38,391.—Horse-tooth Files.—J. P. Howell, Washingtonville, N. Y. Antedated Feb. 21, 1863:

I claim a horse-tooth file composed of a cast-metal stock or handle, A, and a file, B, made separately and fitted together, substantially as herein shown and described.

[This invention consists in having the file and stock made separately and the file fitted in the stock in such a manner that it may be adjusted and secured therein and renewed therefrom with the greatest facility, and a far more economical implement obtained for the purpose than hitherto used.]

38,392.—Sash Fastening.—F. M. Hubbard, Protection, N. Y.:

I claim the driving wheel, g, the wheel, k, the spring, h, the cam wheel, L, and the knob, e, the whole arranged in the manner and for the purpose substantially as set forth.

38,393.—Watch.—H. B. James, Trenton, N. J. Antedated Nov. 14, 1862:

I claim, first, Providing an elastic vibrating support for the balance spring, substantially as herein specified.

Second, Combining the use of the elastic vibrating support for the balance spring with the system of compensation for expansion, which constitutes the subject matter of my Letters Patent of December 27, 1859, by making the said elastic support of combined laminæ of two metals, substantially as herein specified.

Third, The within-described mode of connecting the balance spring and elastic vibrating support by means of the slide ring, e, applied in combination with the enlarged end of the arm, b, of the said support, as herein specified.

Fourth, Securing the elastic supporting coil, B, to the plate, C, by means of the taper stud, a, applied to the coil and plate, in the manner herein specified.

38,394.—Plow Clevis.—Joseph Keech, Waterloo, N. Y.:

I claim the dial-plate, C, provided with cogs, d d, on one side, engaging with the cogs, a a, of the beam, and with concentric, radial teeth, g g, on the other side, engaging with the index-plate, D, that sustains and adjusts the draft rod substantially as and for the purposes herein set forth.

38,395.—Ox-bow Fastening.—Elisha Kenny, Livermore, Maine:

I claim the spring, B, combined with a bow cap, in the manner and for the purpose herein set forth.

38,396.—Fence.—Theodore E. King, Ashtabula, Ohio:

I claim, first, Securing the posts to the base, G, by means of the flanges, E, and screws and nuts, F F′, as specified.

Second, I claim the adjustable brace, O, for supporting the panel in an upright position, arranged and operating as set forth.

Third, I claim the brackets, figure 6, for securing the panels to the posts as specified.

Fourth, I claim the brackets, M N N′, for uniting the panels and securing them to the base, G, as described.

Fifth, I claim the gate brackets, P Q P′, and the hinge, R S S′, shown in figure 7, constructed and arranged as and for the purpose set forth.

38,397.—Machine for making Nuts.—Philip Koch, New Haven, Conn. Antedated April 18, 1863:

I claim, first, The stationary cutter formed of the steel bar, C, with a hole, b, made in it, in connection with the lever, D, or its equivalent, arranged as shown to cut the blank from the bar from its under side upward, substantially as set forth.

Second, The combination of the die, O, and punch, Q, when arranged as shown, to operate as and for the purpose specified.

Third, The pin, w, attached to the spring, U, and having the spiral spring, W, connected with it in combination with the slides, X X′, all arranged as and for the purpose described.

Fourth, The combination of the die, C′, and movable bed, B′, arranged for joint operation substantially as and for the purpose specified.

Fifth, The slides, G I, arranged as shown when used in combination with the lever, D, and stationary cutter bar, C, as and for the purpose set forth.

Sixth, The slides, X X′, arranged as shown when used in combination with the pen, w, and box, T, to operate as and for the purpose specified.

[This invention consists in a novel and improved manner of cutting off the blanks from the bars and forging or hammering the sides thereof, and also in an improved manner of punching the blanks and finishing the same, whereby it is believed the nuts may be manufactured in a more rapid and prompt manner than hitherto.]

38,398.—Apparatus for upsetting Tires.—M. P. Larry, Windham, Maine. Antedated Jan. 16, 1863:

I claim a tire shrinker, constructed, combined and arranged as shown and described.

38,399.—Lathe for turning Irregular Forms.—Edward Lumley, Elizabeth City, N. J.:

I claim vibrating the cutter, H, in the manner and for the purpose hereinbefore specified.

38,400.—Lock and Latch.—Burton Mallory, New Haven, Conn.:

I claim a reversable latch-bolt when the same is placed in a case independent of the lock case, and made reversable in the manner substantially as herein specified.

38,401.—Water Elevator.—J. B. McMillan, North Vernon, Ind.:

I claim the combination and arrangement of the ratchet collar, F, compound pawl and brake, E D, tipping hook, L, tipping bail, B, and return spout, G, all substantially as shown and described.

38,402.—Apparatus for cutting Ornaments in Paper and Leather, &c.—John D. Mets, Dubuque, Iowa.:

I claim, first, Combining with the frame-work, A and B, the knife, a, and the frame, C, and its knife, b, and the yielding platforms, D and E, as and for the purposes described.

Second, The removable cutter frame, C, with its yielding platform, E, when arranged within an outer cutter frame, substantially as and for the purpose described.

Third, Constructing the main knife-frame so that it will constitute a holder or support for one or more removable knife-frames, substantially as described.

38,403.—Apparatus for grinding File Blanks.—Sargent O. Morse, Medford, Mass.:

I claim the blank-holder, a, when made with the recess (corresponding in depth to the blank to be ground, so that its faces shall be patterns to which to reduce the surface of the blank), and with the clamps, b, for grasping the tang.

I also claim combining with the tang-holder, a, the gage-plate, g, when made with the pattern lips or edges, and to be confined directly to and so as to form part of the holder or carrier, for the purpose as above set forth.

38,404.—Saddle.—Barak T. Nichols, Newark, N. J.:

I claim the combination of the screw bolts, S S, with the springs, D D, substantially in the manner and for the purposes described.

38,405.—Parallel Vise.—N. P. Otis, Yonkers, N. Y. Antedated May 3, 1863:

I claim, first, The strap, D, and bar, C, applied to the part, a, of the shank or pillar, B, of the vise and connected by the keys, E, when the said part, a, has any angular or irregular form which will adapt it to be firmly held, substantially as and for the purpose described.

Second, The combination of the cross-bars, J J, bar, C, strap, D, shanks or pillars, B H, swivel jaw, A, permanent jaw, I, screw, G, and socket, F, when arranged as shown to form an improved article of manufacture for the purpose specified.

[This invention relates first to an improvement in the arrangement and application of the cross-bars which are connected to the shanks or pillars of the jaws, whereby the latter are protected from all twisting or torsional strain, and the vise rendered more durable than those previously constructed. The invention consists, secondly, in a novel and improved means for adjusting and securing the vise in different positions relatively with the bench as the convenience of the workman may require, whereby the vise may be readily adjusted and firmly held in the desired position by a very simple contrivance and one which will not appreciably augment the cost of construction. The invention consists, thirdly, in an improved manner of securing the back jaw to its shank or pillar, whereby the same, when taper articles are to be secured in the vise, will be allowed to adjust itself, as the movable jaw is secured up towards the stationary one, in proper relative position with the work and grasp the same firmly.]

38,406.—Door Knob.—Emory Parker, Meriden, Conn.:

In combination with the screw-threaded knob and the screw-threaded angular spindle, I claim the clamp piece, b, or its equivalent fitting a recess in the shank and located within the escutcheon of the knob in the manner and for the purpose substantially as set forth.

38,407.—Adjustable Port-hole for directing Ordnance.—Philip G. Petty, Chief Engineer in the U. S. Navy:

I claim, first, The use of spirally-grooved rollers, substantially as herein described, rotated by a screw, lever, or other suitable means for the purpose of presenting at any desired height, an aperture to receive the muzzle of the gun.

Second, Elevating or depressing guns by means of spirally grooved rollers, substantially as herein described.

Third, The reversible boxes, F F, employed in the described combination with the rollers, D D, for the purpose of changing their distance asunder.

Fourth, The casing, J, employed in the described combination with the rollers, D D, to exclude smoke and gas.

38,408.—Vertical Windlass.—Charles Perley, New York City:

I claim, first, Arranging the shaft to which the motive power is applied and the vertical shafts carrying the chain heavers in a triangular position, so that the said heavers may be brought nearer together transversely of the vessel as set forth.

Second, I claim the combination of two pinions or wheels, k and v, with the gearing of the vertical windlass, when said wheels, k and v, are of different sizes and fitted in such a manner as to be connected to or disconnected from the motive power, substantially as specified, in order that the vertical windlass may receive a faster or slower movement from the motive power as set forth.

Third, I claim the construction of the coupling squares on the shaft, i, and the recesses in the respective wheels, k and v, whereby one wheel is coupled and the other uncoupled, by an endwise motion given to the said vertical shaft, i, as specified.

Fourth, I claim the arrangement of the pinion, w, and shaft, z, for raising and lowering the shaft, i, as specified.

Fifth, I claim constructing the box or base of the vertical windlass containing the gearing of a triangular shape in its general outline, in order that the said base may occupy but little space and more firmly sustain the strain of the chain cables as specified.

Sixth, In combination with a chain heaver fitted in such a manner that it may be rotated from below, or disconnected from the motive power, I claim double gearing for communicating a fast or slow motion to such chain heaver, substantially as specified.

Seventh, I claim constructing the base box of the vertical windlass with the elevated portion, e, above the top, b, substantially as shown, whereby double gearing can be introduced and the chain wheels are raised from the deck as little as possible, as set forth.

38,409.—Constructing Cannon.—Charles Perley, New York City:

I claim the barrel, a, with the exterior surface tapering both ways in combination with the ring, c, and breech cap, b, drawn together by screw bolts or their equivalents as and for the purposes specified.

38,410.—Swage for Zinc Washboards.—John Poole & Thomas J. Pattin, Harmer, Ohio:

We claim the bed-plate, C, the weighted lever drop, L, in combination with the cam or snail wheel, G, and spring catches, w w, in the manner and for the purpose set forth.

38,411.—Clamping and nailing Washboards.—John Poole & Thomas J. Pattin, Harmer, Ohio:

We claim the sliding clamps, E E, standards or posts, B B, with the lever, L, and cams, D D, in the manner and for the purposes set forth.

38,412.—Process for Graining and Ornamental Painting.—William J. Potter, Chicago, Ill.:

I claim the employment in connection with the aforesaid roller, of some suitable solution as described, for preventing the drying of the paint forming the figure or ornament, and thereby producing the ornamental design required, by subsequently removing the paint forming such figures in the design, substantially as and for the purposes specified and described.

38,413.—Suspended.

38,414.—Shot Metallic Cartridges.—E. K. Root, Hartford, Conn. Ante-dated May 3, 1863:

I claim the combination of a charge of powder, a charge of shot and the fulminate, with a case or shell, surrounding or inclosing them, constructed substantially in the manner described and for the purpose set forth.

38,415.—Marine Propeller.—John B. Root, Brooklyn, N. Y.:

I claim the arrangement of the blades and hub of the propeller substantially as herein specified whereby the water is drawn from the circumference toward the center and discharged from the center directly astern of the vessel as herein set forth.

38,416.—Pump.—Henry Rosen, Elkhart, Ind.:

I claim driving the buckets of the two barrels, A and A′, from a crank shaft, I, through the medium of the rods, K and K′, arms, D and D′, and rods, B and B′, the whole being arranged and operating as and for the purpose herein set forth.

38,417.—Gas Burner.—George C. Roundey, New York City:

I claim the combination of the cap-tube, A, the expansion chamber, B, and fish-tail tip, C, substantially as herein described.

[This invention relates to that kind of burner which is placed like a cap over an ordinary burner, and it consists in the combination of a tube or globular expanding chamber and a tip.]

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38,418.—Apparatus for Launching Vessels.—Thomas F. Rowland, Greenpoint, N. Y.:

I claim the arrangement or use, in connection with the ways, A C, of the rotating shaft, D, extending from one set of ways to the other and provided with catches, b, all operating in the manner herein shown and described.

38,419.—Device for heating Ores for Smelting Furnaces.—Alfred Roger, Reeds Mills, Ohio:

I claim the grate, D, adapted to present the ore in an open condition to the flame of the tunnel head, and to discharge the heated ore, the said grate being preserved from destruction by a current of water traversing its interior, the whole being combined and operated substantially as set forth.

38,420.—Hay-elevating Fork.—Luman Rundell, New Baltimore, N. Y.:

I claim extending the tines of a hay-fork back of the head in a sharp curve and thence to their points in a flat curve, substantially as herein shown and described, and in such relation to the handle and loop from which the fork is suspended in elevating the same, that said tines can be easily rocked into the hay and that in elevating the load lodges in the sharp curve where it exerts almost no lateral strain on the butt ends of the tines, and consequently the liability of snapping the same at the place where they enter the head is obviated.

[An engraving of this fork was published on page 304, current volume of the SCIENTIFIC AMERICAN.]

38,421.—Horse-power.—W. J. Sage, Steubenville, Ohio:

I claim the combination of the two toothed wheels, C D, pinion, E, and shaft, F, arranged to operate in the manner as and for the purpose herein set forth.

[This invention consists in the employment or use of two horizontal wheels provided with cogs which gear into a pinion, said wheels being placed one over the other and arranged in such a manner that the horse may act upon the lower wheel with his feet and pull or draw upon the upper wheel, thereby acting in two different ways and in the most efficient manner to propel machinery.]

38,422.—Lamp Burner.—Orrin J. Savage & George P. Hawley, Ithaca, N. Y.:

We claim, first, The cone, A, with its slot narrowed at the top, and gradually widening by straight and uniform lines to the bottom of the square or rectangular bottom as represented.

Second, The combination of the cone, A; the broad and flaring, finely perforated or foraminous sheet metal belt, B, widening as it descends, and the base, C, narrowing as it descends, with large perforations; made and used as represented and described, for the purposes set forth.

38,423.—Cooking Stove.—Jacob H. Shear, Albany, N. Y.:

I claim the combination of the flue, M, and its openings, a a b b, flue, H, and its openings, e e, and its openings into flues, C and E, with the back and bottom flues, C D E, in the manner and for the purposes set forth in the above specification.

38,424.—Composition for filling Shells.—Levi Short, Philadelphia, Pa.:

I claim, first, A combustible composition formed of the above named ingredients or their equivalents, substantially in the proportions and for the purposes herein set forth.

Second, I claim metallic pellets or missiles filled with combustible matter in combination and use with explosive projectiles for the purposes and substantially as set forth.

38,425.—Grain Separator.—Otis W. Stanford, Mason, Ohio, and Andrew W. Crane, Lebanon, Ohio:

We claim the vertically and laterally agitated shoe, B, having the riddle, D, in the upper front part of it, immediately under the hopper and mainly out of the blast, in the described combination with a case, A A′, having that part of it, A, which contains the shoe, so much wider than that part of it, A′, which contains the fan, as to enable the interior width of the shoe at its front end to be equal to or somewhat in excess of the fan case at its front end, as and for the objects set forth.

38,426.—Cooking Stove and Range.—David Stuart, Philadelphia, Pa.:

I claim, first, The chamber, F, with its door, k; the chamber, G, the fireplace, J, and the oven, L, when the said chambers are arranged to receive the culinary vessels, to communicate with each other, and the fireplace, and in respect to each other and the oven, substantially as and for the purpose herein set forth.

Second, The culinary vessel, g, the flange, p, on the upper edge of the same, said flange resting on a ledge, n′, so formed in the top-plate, A, of the stove, and so situated in respect to perforations, v, that the said perforations shall form a communication between the interior of the vessel and the chamber within which the vessel is suspended, for the purpose described.

Third, The combination of the compartment, F, the perforated door, k, and the perforated valve, d, or its equivalents, the whole being arranged for roasting, frying, broiling, and other like purposes substantially as described.

38,427.—Instrument for ascertaining the Amount of Water, &c., in Barrels of Oil, &c.—Guiseppe Tagliabue, New York City:

I claim, first, The tube constructed of metal and glass.

Second, The valves at top and bottom acted on by one rod and opening and closing together.

Third, The graduated scale on the glass sides of the tube constructed as aforesaid.

Fourth, The whole constructed substantially as and for the purpose described.

38,428.—Chair.—Daniel E. Teal, Norwich, N. Y.:

I claim the combination of the seat, A, the springs, C C, or their equivalents, and the frame, B, adapted to tilt back at the will of the sitter against the resistance of the springs, substantially as shown and described.

38,429.—Apparatus for generating Gas from Petroleum and other Hydro-carbons.—George W. Thompson and Joseph Foster, Bordentown, N. J. Ante-dated Nov. 10, 1862:

We claim depositing on the bottom of the retort a layer of unslacked lime, charcoal, or other equivalent material, and so arranging the feed pipe, D, that the oil will drop directly on to the said layer, as and for the purpose herein set forth.

38,430.—Machinery for molding Pottery.—John Fresch, New York City:

I claim, first, The arrangement of the double-headed reciprocating carriage, C, each head being provided with a series of revolving cores, e, in combination with two stationary flasks, D D, one opposite to either head of the carriage, all constructed and operating as and for the purpose described.

Second, The arrangement of a hinged cap, j, and brace, k, in combination with a sectional flask, D, constructed and operating in the manner and for the purpose substantially as described.

Third, The employment of the remover, D, constructed substantially as specified, for the purpose shown and described.

[The object of this invention is to mold a large quantity of flower pots or other similar articles by machinery in a short time and with little labor.]

38,431.—Beehive.—Waters Warren, Three Oaks, Mich.:

I claim the body, B, and spare-honey box, E, constructed of alternate sides of wood and glass and arranged in polygonal form, in combination with the cap or cover, G, and platform, A, substantially as described.

I further claim the manner of arranging or applying the spare-honey box, E, to the body, B, of the hive, to wit: by fitting the box, E, on a central pivot or pin, e, when said box, E, is provided with holes, h, in its bottom, g, and the top, C, of the body, B, is provided with similar holes, e′, as and for the purpose specified.

[The object of this invention is to obtain a bee-hive which will be extremely simple in construction, economical to manufacture, and admit of having honey readily taken from it.]

38,432.—Elliptic Spring.—Richard Vose, New York City:

I claim the combination of one or more curved, metallic bearing plates, A and A′, with one or more curved, metallic tension plates, B and B′, when said plates are arranged in planes at right angles to each other, substantially as herein set forth.

When bearing plates, A and A′, are arranged and combined with tension plates, B and B′, in the formation of an improved spring, substantially as herein set forth, I claim confining and securing said plates by means of the metallic heads, C C, and D D, or their equivalents, substantially in the manner herein described.

I also claim the use of intermediate, compensating springs, when combined with the bearing plates, A and A′, and tension plates, B and B′, of my improved spring, substantially in the manner and for the purpose herein set forth.

38,433.—Arrangement of Conducting Pipes and Manifolds.—Caleb C. Walworth, Boston, Mass:

I claim the combination of the conducting pipe, valve and manifold when arranged substantially as herein shown and described.

38,434.—Cherry-stoner.—Theophilus Van Kannel, Chester, Ill.:

I claim, first, The curved spring-rocker, E, constructed and applied to the mouth of the hopper and operating in conjunction with the slide, F, or its equivalent, for feeding cherries to the machine one at a time, substantially as described.

Second, An automatic device, I I′, applied to a sliding box, F, for discharging the stoned cherries separately from the machine, substantially as herein described.

Third, An alternately sliding and vibrating claw-plate, I I′, substantially as and for the purposes herein described.

Fourth, A removable plate, K, applied to and forming a part of the box, A, substantially as and for the purpose described.

Fifth, The combination of a conical hopper, D, with an automatic feeding device, E, and slide, F, substantially as and for the purpose described.

Sixth, The perforated reciprocating basin, G, for receiving and centering the cherries and retaining each cherry during the operation of the stoning fork, H, in combination with a machine operating substantially as herein described.

Seventh, A machine for stoning cherries operating substantially as and for the purposes specified.

38,435.—Safety Switch for Railroads.—Charles H. White, Emmett, Mich.:

I claim the use of the flanches, I I, tongues, n n, grooves, e e, rebates, u u, and flange supporters, J J, in combination with the track switch rails, A A, when arranged relatively with each other and with the said rails, substantially as and for the purposes specified.

38,436.—Hoisting Oyster Dredges.—Joseph Whitecar, Philadelphia, Pa.:

I claim constructing and arranging a pair of conical wheels, substantially as described, in combination with an oyster or other dredge, for the purpose above set forth.

38,437.—Skirt-supporter.—Norman Wiard and Hermann Shlarbaum, New York City:

We claim the new article of manufacture herein described, consisting of hinged levers adapted to be operated by a single band of elastic material held in place on the levers, as represented, and lipped, in order to receive and hold suitable parts to seize the skirt in the manner shown.

38,438.—Process of manufacturing Illuminating Gas.—S. Lloyd Weigand, Philadelphia, Pa.:

I claim the combination of the processes disclaimed when combined in the manner or in any equivalent manner, as set forth and described.

38,439.—Grinding the Upper Cutter of Nail Machines.—George B. Wiggin and J. W. Hoard, Providence, R. I.:

We claim the arrangement of the grinding wheel, C, and the carriage, F, for grinding the movable cutter of a nail machine, substantially as described.

38,440.—Window-sash Fastener.—Samuel H. Williams, Shoemakerville, Pa.:

I claim the serrated oval rollers, B B, in combination with the adjustable screw, D, when said devices are used for the purpose described and set forth.

38,441.—Incendiary Shell.—Loftis Wood, Brooklyn, N. Y.:

I claim the invention of coating or lining a shell projectile with the composition herein before described, or with any other equivalent fire-proof substance, susceptible of producing the same result as set forth.

I also claim the construction of a cast-metal shell, a a a a, b b, c c c, formed with a smaller enclosed charge chamber, d d, and a larger enclosed incendiary chamber, e e e e, when formed and separated by a transverse air-tight partition or diaphragm, f f f, the interior surfaces of which are coated with any fire-proof, non-conducting composition, as shown in Fig. 2 and indicated at I I I, through all of which and whereby any molten or fused metal may be effectually and safely enclosed within an explosive mass, thus composing an incendiary and explosive projectile for the purposes as herein before fully set forth and described.

38,442.—Tourniquet.—Frederick W. Bond (assignor to John B. Murray), Cypress Hills, N. Y.:

I claim the employment of an endless band of vulcanized rubber as an elastic ligature, in the combination of a pad and elastic ligature, substantially as described.

38,443.—Metallic Burial-case.—Martin H. Crane (assignor to Crane, Reed & Co.), Cincinnati, Ohio:

I claim the production, as a new article of manufacture, of a sectional metallic burial-case, that is to say, a case whose lower shell, or both upper and lower shells are composed of two or more parts, which may be united for use or disunited for transportation, at pleasure, substantially as set forth.

I also claim making the top, bottom, ends and sides cast in separate pieces or sections united at the angles by overlapping flanges, substantially as set forth.

I also claim forming upon each section a flange arranged to lap over or under a corresponding section flange in such manner as to admit of the interposition of a cementing substance, substantially as set forth.

I also claim providing the flanges of the lower shell section with lugs, or their equivalent, to receive the ends of the screws, substantially as set forth.

38,444.—Pump.—Joseph W. Douglas (assignor to W. and B. Douglas), Middletown, Conn.:

I claim the valves, j j, k k, all placed on one and the same plate, when used in combination and arranged with a cap, E, and a single screw-bolt, F, passing through a pier, e, substantially as shown and described.

[This invention relates to an improvement in the force pump, and consists in a novel arrangement of the valves and valve box, whereby all the valves may be rendered accessible by the removal of one nut only.]

38,445.—Sail Hank.—Charles Ellis (assignor to himself and Daniel Douglass, 3d), Gloucester, Mass.:

I claim the combination and arrangement of the sail hank and the two sets or ranges of friction rollers, in manner and so as to operate substantially as described.

38,446.—Manufacture of Sheet-iron Hard-ware.—John Grey and John D. Grey (assignors to themselves and Thomas Grey), Pittsburgh, Pa.:

We claim making articles of seamless hollow-ware out of sheet-iron in the manner substantially as described, by the use of a succession of shallow, bottomless dies, having flaring or curved sides, each die in the series being of greater diameter than the last, with forcers of corresponding shape and depth, whereby the articles are gradually shaped from a flat disk by successive stages, the bottom or central part of the disk being last shaped.

38,447.—Sewing Machine.—Frederick W. Grote) assignor to himself and Claus O. Tietzen), New York City:

I claim, first, The combination of the cylinder, G, the spool case, J, spool, I, and stationary plate, H, the whole constructed and arranged to operate substantially as and for the purpose herein specified.

Second, The construction, combination and arrangement of the bar, N, carrying the feed wheel, and the needle-bar, E, substantially as herein specified, whereby the feed wheel is enabled to be adjusted around the needle to feed in various directions and always kept close to the needle.

Third, Operating the feed wheel by means of a dog lever, P, applied to the said wheel, a lever, R R′, attached to the bar, N, which carries the feed wheel and connected with the dog lever, P, and a wiper, 23, attached to the needle-bar, the whole combined and arranged to operate substantially as herein specified.

38,448.—Dry Gas Meter.—Charles C. Lloyd (assignor to himself and R. H. Gratz & Co.), Philadelphia, Pa.:

I claim, first, Dispensing with the use of packing around the shafts of the spiral flange wheel and the index mover, or either of them, by placing the said spiral flange wheel, G, outside of and separated from the gas chest, substantially as described for the purpose specified.

Second, I claim the employment of a supplementary packing box in combination with each of the vibratory flag shafts used for operating the valves and index, the said packing boxes being placed in the top-plate of the gas chest, substantially as described and set forth for the purpose specified.

Third, I claim the arrangement of the valves, B B′, in such relation to the final outlet channel, L, that the latter shall serve as a single and direct outlet channel from the central openings of the said valves to the outside of the meter, substantially as described and set forth, for the purpose specified.

Fourth, I also claim making the curved recesses, 2 2 3, in the two side faces of either the cap or seat of each of the valves of a dry gas-meter, substantially as described and fet forth, for the purpose specified.

38,449.—Preparing Hydrated Silicates of Potash and Soda.—John M. Ordway, of Manchester, N. H., assignor to Charles E. Hodges, of Dorchester, and Nathaniel D. Silsbee, of Boston, Mass.:

I claim the process, substantially as described, of producing a solid, hydrated alkaline silicate, the same consisting in treating a solution of silicate by precipitating the silicate, and subsequently pressing and drying it, substantially as specified.

I also claim the application of chloride of sodium or a neutral alkaline salt to a solution of an alkaline silicate, as a means of effecting precipitation of the mineral matter of the solution.

38,450.—Sewing Machine.—Charles H. Palmer (assignor to himself and Samuel Colgate), New York City:

I claim, first, The construction and arrangements of the parts, A A1 A2 A3, so as to form the framing of a sewing machine, substantially in the manner and for the purpose herein set forth.

Second, The construction and arrangement of the presser foot, C, center, c, cams, D D′, and screw, d, substantially as and for the purpose herein set forth.

Third, The construction and arrangement of the slot, a a′, spring, C′, center, c, and presser foot, C, substantially as and for the purpose herein set forth.

Fourth, The combination of the wheels, G G′, with the yoke, F, and projections, f f′, substantially in the manner represented and for the purpose herein set forth.

38,451.—Horseshoe.—Isaac Peacock (assignor to himself and S. S. Sawyer), Shortsville, N. Y.:

I claim, first, Constructing a shoe with the continuous calk, d, in combination with the continuous stiffening rib, e, and the wide bottom surface or groove, a′, substantially as herein described.

Second, In combination with the improvement embraced in the claim above, the peculiar manner of curving the shoe at the heel, as shown and described, for the purpose set forth.

38,452.—Paper-bag Machine.—S. E. Pettee (assignor to the Union Paper-bag Machine Company), Philadelphia, Pa.:

I claim, firstly, Hanging the spindle, G, which carries the roll of paper to a plate, E, so secured to the frame as to be readily adjusted laterally thereon, for the purpose specified.

Secondly, So connecting the plate, D, which carries the roller, I, and the pasting device to the frame, that the whole may be adjusted laterally on the said frame, for the purpose specified.

Thirdly, Folding the continuous sheet by means of a pulley or pulleys, M M, or their equivalents, in combination with the horizontal pulleys, d d, or their equivalents, to the same, the sharp edges of the pulleys forming the crease at the proper place in the paper, and the pulleys, d d, or their equivalents turning down the fold determined by the creasing pulleys, thereby enabling me to dispense with the objectionable "former" used in the machines for making paper bags.

Fourthly, So securing the creasing pulleys, M M, to the shaft, L, that they can be adjusted thereon, in respect to each other and to the paper, for the purpose described.

Fifthly, The roller, h h, secured to the bar, P, and so arranged as to present a lateral sagging of the paper without disturbing the creases made by the pulleys, M M.

Sixthly, So constructing the revolving striker that the striking bar can be moved to and from the center of rotation and secured after adjustment, for the purpose specified.

Seventhly, The revolving striker, when arranged in respect to the rollers, v v, and rollers, w and w′, as and for the purpose herein set forth.

Eighly, Imparting to the pasting blade, 15, by the devices herein described, or their equivalents, the motion described to and from the pasting roller, as well as the motion described to and from the folding rollers, for the purpose herein set forth.

Thirdly, The beveled portion of the plate, 15, so formed and arranged as to conform or nearly conform to the circumference of the roller, 6, and so as to effectually transfer the paste to and spread it over the fold at the bottom of the bag, as described.

Tenthly, The roller, 7, with its angular projecting plate, 2 2, when combined and operating in conjunction with the paste roller, 6, substantially as and for the purpose herein set forth.

38,453.—Lamp.—W. H. Pierce, Somerville, Mass., assignor to himself and Samuel Adlam, Jr., Boston, Mass.:

I claim, first, Providing the metallic collar of a lamp with a projecting portion or continuation, which shall form the handle of the lamp, substantially as set forth.

Second, I claim the combination of a glass lamp body, A, metallic collar, B, handle, C, substantially as set forth.

Third, Fastening a metallic handle to a glass lamp by means of the collar, and without puncturing the glass, substantially as set forth.

38,454.—Machine for rolling File Blanks.—Charles Spofford and A. B. Southwick (assignor to the Whipple File Manufacturing Company), Ballardvalle, Mass.:

We claim the rolls, E and F′, in combination with the carriage, P, arranged and operating in the manner described for the purpose set forth.

RE-ISSUE.

1,471.—Cement for uniting Leather and other Substances.—Samuel F. Hilton, of Providence, R. I., and Willliam D. Hilton, of Cranston, R. I., assignees of said Samuel F. Hilton. Patented August 13, 1861:

We claim, as a new article of manufacture, a cement made of the two materials heretofore first mentioned, in combination substantially as described.

DESIGNS.

1,757.—Link of a Chain.—Egbert S. Richards, Attleboro', Mass.

1,758.—Breast-pin and Ear-drop.—Egbert S. Richards, Attleboro', Mass.

EXTENSION.

Method of making Wire-strengthened Spoons.—William Mix, Prospect, Conn. Letters Patent No. 6,413, dated May 1, 1849. Re-issued, No. 480, dated August 4, 1857:

I claim casting the spoon handle in a mold of larger dimensions than the finished handle is required to be, as herein set forth, and subsequently swaging the handle into the proper shape, and condensing the metal upon the strengthening wire by means of the drop press and dies, as described.

Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row New York.

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IMPORTANT TO INVENTORS

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts is promptly sent free of charge. Address MUNN & CO. No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 down to $15. Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Notes and Queries

W. S. L., of Pa.—We have never known a case of a near-sighted person being restored to perfect vision [by manipulating the eyes.

J. L. Q., of Pa.—Spiral springs are manufactured at the Novelty Works and by Messrs. Hoe, of this city.

E. S. R., of Pa.—You will find a description of the mode of constructing an ice-house on page 16, Vol. VI (new series) of the SCIENTIFIC AMERICAN. It should be built on a northern exposure. with double boarded walls and roof, leaving a space between the planking to be packed with saw-dust or straw. It should be built above ground.

D. D., of Pa.—The best paste that you can use for a scrap-book is that which is sold for general use under the name of mucilage. It is made from starch roasted at a temperature of 300° Fah., and is called dextrine.

N. P. M., of Ohio.—To cover your pulley so that a belt will not slip on it, take an old belt and turn the flesh side out, drill holes in the pulley, make holes in the belt to correspond and rive it to the pulley with copper rivets. A better way is to lace the belt tight and throw a little rosin and oil on it; the belt will not slip then.

T. H., of Pa.—Your communication on aerial navigation is too long and otherwise unsuitable to onr columns. Your MSS. is at your disposal.

J. G. G., of Ill.—We have never received your note on the length of the boiler to furnish steam at 40 pounds pressure per square inch. The length of a boiler is governed by the amount of heating surface desired, and we wish all whom it concerns to bear in mind the fact that we do not furnish estimates or calculations for building steam or any other machinery. We could not attend to a tithe of the business of this class that comes to us and give attention to our legitimate duties.

A. L. P., of N. Y.—We cannot tell you how to proceed to get the appointment of Professor of Mathematics in the Navy. You had better write to Secretary Welles on the subject. There is no publication devoted exclusively to naval engineering.

O. T. W., of Iowa.—You can obtain a work on mills and milling by addressing Henry C. Baird, of Philadelphia.

J. C., of Md.—The patentee of the connecting link resides in Texas, and it is not at all likely that he has any agent in this section

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, May 6, to Wednesday, May 13, 1863:—

F. C. P., of N. Y., $25; J. W. H., of N.Y., $50; L. C., of N.J., $16; M. & C., of N.Y., $15; E. C. H., of N.Y., $20; T. T. H., of N.Y., $16; W. J., of Wis., $20; B. W., of N. J., $16; G. J., of N. Y., $26; T. R., of N. Y., $54; G. D., of Pa., $20; J. S. C., of Mich., $15; A. H. C., of Wis., $26; H. S. J., of Cal., $30; R. R., of Ill., $12; M. T. W., of Ky., $30; L. A. B., of Ind., $15; R. D. N., of N. H., $20; G. C., of N. Y. $36: O. F. W., of Conn., $367; J. C. W., of N. Y., $26; S. W., of Mass., $36; F. D. B., of Ind., $20, A. J. H., of Pa., $25; D. S. E., of Mass., $16; J. H., of Pa., 16; A. S. M., of Ill., 52; J. M., of Cal., $40; F. A. De M., of N. Y., $25; C. T. D., of N. J., $25; S. R. S., of N.Y., $36; W. H. F., of Mass., $20; A. M., of N. Y., $20; J. K. U., of N. Y., $22; O. E., of N. Y., $45; C. F. T., of N.Y., $16; J. B., of N. Y., $16; L. B., of N. J., $16; C. M. S., of Mass., $20; M. & M., of Cal., $40; H. H. B., of N. Y., $25; C. J. P., of Cal., $15; J. H. M., of Mo., $12; O. P., of Vt., $16; E. & K., of Cal., $18; B. A. H., of Iowa, $15; G. B. McD., of Ky., $20; F. A., Jr., of Mich., $34; L. E. R., of Mich., $15; E. R. S., of Mich., $12; P. L. S., of Pa., $25; J. C., of Va., $7; J. F. J., of N. Y., $10; E. J. Y. P., of N. Y., $150; J. A. G., of Iowa, $25; H. W. M., of N. Y., $16; J. P., of N. Y., $25; J. McK., of N. Y., $20; E. L. P., of N. Y., $41; W. & C., of N. H., $20; F. H. B., of N. Y., $20; J. R., of Minn., $20; H. K., of N. Y., $16; J. W. B., of Ill., $20 S. R. S., of N. J., $20; T. J. McG., of Ohio, $20; J. C., of Mass, $150; G. G. H., of Ill., $25; W. J., of N. H., $25; S. F. G., of N. Y., $25; H. W., of N. Y., $16; R. H. B., of N. Y., $16; J. H. R., of Conn., $26; H. P., of Pa., $16; S. S. & D. C., of Ill., $25; J. T., of N. Y., $16; D. & H., of Ohio, $15; W. S. J., of Conn., $25; S. W. D., of N. Y., $12; J. N. W., of Ill., $15; F. & B., of R. I., $16; T. R. C., of Iowa, $26.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to

parties with the following initials have been forwarded to the Patent Office from Wednesday, May 6, to Wednesday, May 13, 1863:—

F. C. P., of N. Y.; F. A. De. M., of N. Y.; J. P., of N. Y.; J. W. H., of N. Y. (2 cases); C. T. D., of N. J.; S. R. S., of N. Y.; E. L. P., of N. Y.; M and C., of N. Y.; J. K. U., of N. Y.; C. F. T., of N. Y.; T. R., of N. Y.; P. and H., of England; R. R., of Ill.; J. H. M., of Mo.; S. F. G., of N. Y.: W. J., of N. H.; C. and J. A., of Ill.; G. G. A., of Ill.; H. H. B., of N. Y.; A. H. C., of Wis.; J. S. C., of Mich.; C. S., of Ill.; G. C., of N. Y.; J. H. R., of Mich.; S. W. D., of N. Y.; E. R. S., of Mich.; F. D. B., of Ind.; J. A. G., of Iowa; W. S. J., of Minn.; S. S. and D. C., of Ill.; P. L. S., of Pa.; A. J. H., of Pa.; M. and S., of Iowa; J. C. W., of N. Y.; A. S. M., of Ill. (2 cases).

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V. AND VII. (NEW SERIES) complete (bound or unbound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which include postage. Price, in sheets, $1 50. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Nearly all the numbers of VOL. VI are ont of print and cannot be supplied.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

GENERAL ORDERS, NO. 105.

WAR DEPARTMENT,
ADJUTANT GENERAL'S OFFICE,
WASHINGTON, April 28, 1863

The organization of an Invalid Corps is hereby authorized.

This Corps shall consist of Companies, and, if it shall hereafter be thought best, of Battalions.

The Companies shall be made up from the following sources, viz.:

First, By taking those officers and enlisted men of commands now in the field (whether actually present or temporarily absent) who, from wounds received in action or disease contracted in the line of duty, are unfit for field service, but are still capable of effective garrison duty, or such other light duty as may be required of an Invalid Corps. Regimental Commanders shall at once make out, from information received from their Medical and Company Officers, and and from their own knowledge, rolls (according to the Form furnished) of the names of all the officers and enlisted men under their commands who fulfill the following conditions, viz.:

1. That they are unfit for active field service on account of wounds or disease contracted in the line of duty: this fact being certified by a Medical Officer in the service, after personal examination.
2. That they are fit for garrison duty: this fact being likewise certified by the Medical Officer, as above, after personal examination.
3. That they are, in the opinion of their Commanding Officers, meritorious and deserving.

These rolls shall be certified by the Examining Surgeon and Regimental Commander, and transmitted, through the regular channels of military correspondence, to the Provost Marshal General of the United States.

The Regimental Commander shall enter in the column of remarks, opposite each officer's name on the roll, a statement as to the general character of the officer for intelligence, industry, sobriety and attention to duty; and all intermediate Commanders shall endorse thereon such facts as they may possess in the case, or, if they have none, they shall state how far they are willing to endorse the opinion of the officer or officers making the recommendation. Similar rolls shall be forwarded from time to time, whenever the number of men fulfilling the conditions enumerated or the exigencies of the service may render it expedient.

Second, By taking those officers and enlisted men still in the service and borne on the rolls, but who are absent from duty, in Hospitals or Convalescent Camps, or are otherwise under the control of Medical Officers. In these cases the Medical Officer in attendance shall prepare the rolls according to Form, entering the names of officers and men from the same Regiment on a roll by themselves, and send them, with the certificate of the Surgeon, duly signed, to the proper Regimental Commander, who will forward them, as heretofore specified, subject to the same conditions and requirements. If, in any case, the Regimental Commander shall think an officer unfit, in point of character to continue in the service of the Invalid Corps, though disabled and certified by the Surgeon, he will state his objection in the column of remarks, and note the exception before signing the certificate. If any officer or enlisted man now in the service, but absent and beyond the reach of a Medical Officer in charge of a Hospital or Convalescent Camp, desires to enter this Corps, he will take the course indicated below for those who have been honorably discharged from the service.

Third, By accepting those officers and enlisted men who have been honorably discharged on account of wounds or disease contracted in the line of duty, and who desire to re-enter the service. In the case of an officer, application for appointment must be made to the Provost Marshal General of the United States through the officer detailed as Acting Assistant Provost Marshal General of the State. No application of this kind will be considered unless the following conditions are completely fulfilled:—

1. That the applicant produce the certificate of the Surgeon of the Board of Enrollment for the District in which he resides, that he is unfit for active field duty an account of wounds or disease, and is not liable to draft, but is fit for garrison duty.
2. That he furnish evidence of an honorable discharge on account of wounds or disability contracted in the line of duty.
3. That he produce recommendations from the Regimental, Brigade and Division Commanders under whom he formerly served, that he is worthy of being thus provided for and capable of returning adequate service to the Government. In case it shall be impracticable to get this last evidence, he may, having established the first two points above, satisfy the Board of Enrollment that he is deserving, and present its certificate of the fact. This evidence must all be obtained by the applicant, and must be transmitted with his application for appointment.

If there be no Acting Assistant Provost Marshal General for the State, the application may be forwarded through the Adjutant General of the State, who is desired to endorse thereon such facts in the military history of the applicant as he may know, or as are afforded by his records, and forward the same to the Provost Marshal General of the United States. Enlisted men, honorably discharged on account of disability, desiring to re-enlist in this Corps, will present themselves to the Board of Enrollment for the District in which they reside, for examination by the Surgeon thereof, who shall examine them and report the result to the Board of Enrollment.

The Board shall then consider each case, and if the applicant is found to fulfill the conditions specified below, the Board shall give him a certificate to that effect, viz.:

1. That he is unfit for service in the field.
2. That he is fit for garrison duty.
3. That he is meritorious and deserving.
4. That he was honorably discharged from the service.

The Provost Marshal for the District shall then send the application, with this certificate of the Board, to the Acting Assistant Provost Marshal General of the State, who shall procure such evidence of service and character as the records of the Company to which he belonged, on file at the Headquarters of the State, may show, and if satisfied that it is a meritorious case, and that the man is deserving, he will enlist him in accordance with such special rules as the Provost Marshal General may establish.

Medical Inspectors, Surgeons in charge of Hospitals, Military Commanders, and all others having authority to discharge, under existing laws and regulations, are forbidden to grant discharges to any men under their control who may be fit for service in the Invalid Corps.

The Provost Marshal General is charged with the execution of this order, and the troops organized under it will be under the control of his Bureau.

By order of the Secretary of War:

E. D. TOWNSEND,
Assistant Adjutant General,

21 4

BOOTH & MORFIT'S ENCYCLOPEDIA OF CHEMISTRY.—Just ready, the seventh edition of the Encyclopedia of Chemistry, theoretical and practical in its application to the arts, metallurgy, mineralogy, geology, medicine and pharmacy, by James C. Booth, Melter and Refiner, U. S. Mint, assisted by Campbell Morfit, author of "Chemistry applied to the Manufacture of Soap and Candles," and various other books. In one volume, large 8vo. Illustrated by numerous engravings on stone and wood, 978 pages, compactly printed, neatly and strongly bound in sheep, $5. The contents of this valuable book being so very full, it is entirely impossible to publish any list. Some idea of its range and completeness can be formed from the fact that it contains more than 5,000 articles, many of them of the fullest and most elaborate nature. ☞ The above or any other of my Practical and Scientific publications sent by mail free of postage. Every reader of the SCIENTIFIC AMERICAN is particularly invited to send for a catalogue, which will be sent free of postage. HENRY CAREY BAIRD, Publisher of Practical and Scientific Books, 406 Walnut street, Philadelphia.

$60 A MONTH! WE WANT AGENTS AT $60 A month, expenses paid, to sell our Everlasting Pencils, Oriental Burners, and thirteen other new, useful and curious articles. Fifteen circulars sent free. Address SHAW & CLARK, Biddeford, Maine. 21 12*

FLAX, HEMP, JUTE AND MANILLA.—RICHARDSON, Lowell, Mass., manufacturer of needle-pointed card clothing for carding flax, hemp, jute and manilla. 21 13

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BUREAU OF ORDNANCE.

NAVY DEPARTMENT,
Washington City, April 1, 1863.

This Bureau is desirous of ascertaining whether rifled cannon can be made of wrought iron of sufficient and uniform endurance and economy to warrant their being preferred to guns of cast iron only, or of cast iron strengthened with wrought iron.

Proposals will therefore be received from any manufacturers of forged iron, to furnish a finished gun, or a block of metal from which the same may be finished.

The said gun, when finished, to weigh about 10,000 pounds, to be made into a gun throwing a projectile of 100 pounds, as used in cast iron rifled cannon of like weight, to be fired 1,000 times with service charges of the same weight and kind of powder as used in the Parrott 100-pounder, viz: 10 pounds of No. 7, without bursting or wearing in such a manner as to cause apprehensions of bursting.

The quality of metal, price, and other terms, are to be stated clearly in the proposals forwarded.

The Bureau reserves the right to itself of accepting or rejecting any of the proposals.

The time for receiving the proposals is limited to sixty days from date; and proposals will only be received from persons actually engaged in the fabrication of wrought iron.

JOHN A. DAHLGREN, Chief of Bureau.

15 8

RAILROAD IRON FOR SALE.

UNITED STATES MILITARY RAILROAD OFFICE,
250 G STREET, WASHINGTON, D. C., May 12, 1863.

The undersigned will receive bids for the purchase of 938 920-2240 tuns new railroad iron, weighing 60 lbs. to the yard. 266 720-2240 tuns of the above is at the Cambria Mills, Johnstown, Pa., and the balance —672 200-2240 tuns—at Pittsburgh, Pa.

In case a bid is accepted, the party making the same will be notified as soon as practicable. If within ten days the party shall fail to make payment, in Government funds, to the undersigned, the iron for which such bid was made will be subject to sale to any other person.

The right to reject any and all bids is expressly reserved. All bids must be sealed and directed to the undersigned at Washington, D.C., and endorsed "Bid for Railroad Iron." Bids will be received, as above invited, until June 5th, at which time a decision will be given.

21 3 H. L. ROBINSON, Captain and A. Q. M.

THE CELEBRATED CRAIG MICROSCOPE WILL BE mailed, prepaid, for $2 25; with 6 beautiful mounted objects for $3; with 24 objects for $5, by HENRY CRAIG, 180 Center street (3d floor), New York. Liberal discount to dealers.

"The Craig Microscopes are just what they claim to be, and those who wish for such an article will not be disappointed if they should obtain one of these."—*N. Y. Methodist.* 19 13*

JACQUARD MACHINES, WITH APPURTENANCES manufactured and put up. Looms for narrow goods, from silk ribbon to cotton tape, built to order on the most approved principles. W. P. UHLINGER, No. 1,621 North Second street, Philadelphia, Pa. 19 4*

MANUFACTURERS OF THE SPRINGFIELD MUSKET (1855) can obtain a few thousand each of Bands, Rear Leaf Sights and Side Screw Washers. Warranted to pass Government inspection. Apply to W. T. NICHOLSON & CO., Providence, R. I. 19 4*

READER, IF YOU WANT EMPLOYMENT, OR WANT the best (two-threaded) Sewing Machine ever manufactured, send to ISAAC HALE, JR., & CO., Newburyport, Mass., for a descriptive circular of terms, &c. They pay a liberal salary, or allow commission, as the agent may choose. 19 6*

GUTTA-PERCHA CEMENT ROOFING.—THIS ROOFING is fire and water-proof—costs only about one-third as much as tin, and is far more durable. Can be applied by ordinary laborers—is adapted to old shingle roof as well as to new roofs, and answers equally well on steep or flat roofs.

LIQUID GUTTA-PERCHA CEMENT FOR COATING and preserving metal roofs, and for repairing leaky roofs of all kinds. These materials are shipped ready for use (no heat required). Full descriptive circulars, prices, &c., furnished by the JOHNS & CROSLEY MANUFACTURING COMPANY (sole manufacturers), 78 William street, corner of Liberty, New York. 18 4*

DEAF! DEAF! ARTIFICIAL EARS FOR THE DEAF. Send for a descriptive pamphlet to E. HASLAM, 32 John street, New York. 20 2*

NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes, in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 20 4*

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Improved Patent Clothes Frame.

Nearly all our readers who are housekeepers have experienced the difficulties arising from a want of sufficient laundry room, and especially in large cities where the space allotted to each family is comparatively small, this want has been made peculiarly manifest. These difficulties are overcome by the invention of the clothes frame herewith illustrated and described, as it affords a very large amount of space in which to hang garments and occupies a small compass. The annexed cuts represent the improved clothes frame.

Fig. 1 is a perspective view of the frame as opened for use. Fig. 2 is a perspective view of it when closed.

To open the apparatus the buttons, *a*, are first turned into position to release the side-pieces, A A, and the said side-pieces are then, by means of the knobs, B, drawn out at the top and up out of the pedestal, C. They may then be drawn forward and the slides, D (Fig. 1), at the same time run up until the arms, E E and F, acquire horizontal positions where they are held by resting the pins or bolts, on which the knobs, B, are mounted, in the notches, *b*, Fig. 2. The arms, E, are attached at their respective ends to the slides, D, by means of horizontal hinges, and to horizontal vertically-sliding hinges on the central post, G. The ends of the arms, indicated by E′, are also provided with horizontal hinges, attached respectively to the slides, D, and the upper part of the secondary side-pieces, A A. The arms, E, are attached at one end to the slide, D, by a horizontal hinge, and at the other end to the secondary side-pieces, A A, by a horizontal hinge adapted to allow the arms the required vertical movement on said secondary side-pieces. The buttons, *a*, are now turned so as to release the side-pieces, A A, and the latter are drawn forward at the top and up out of the slots in the pedestal, when they may be moved around until the arms, F E′, are at right angles with the arms, E (as shown in Fig. 1); they are held in position in the same manner as the arms, E. The rods, H, each hinged at one end to the central post and having a pin at the other end, are then placed in position to brace and connect together the tops of the secondary side-pieces, A A, which may be connected at the bottom by a common hook and staple. The braces, I, are hinged or pivoted to the pedestal, C, and extended to impart rigidity to the side-pieces, A; the apparatus is then ready for use.

When it is desired to close the frame, the action is simply reversed, the brace rods, H I, being folded against the central post, G; the outer ends of the arms, F E E′, lowered by means of the slides, D; and the sides, A, are replaced and secured in position.

This apparatus provides a large extent of drying surface when open, and may be folded within a very compact space when not in use. A frame, 6 feet high and 7 feet square, will afford 120 feet of space on which to hang clothes. Any required part of the frame can be brought into use, while the rest of it remains closed. By adapting the respective ends of the arms to slide vertically upon the central post and side-pieces, the entire frame may be folded within the hight of the central post, instead of (as is commonly the case) occupying a greater vertical hight folded than open.

The patent for this invention was procured through the Scientific American Patent Agency, on Feb. 24, 1863, and further particulars may be obtained by addressing the inventor, James P. Mayhugh, at Leitersburgh, Washington county, Md.

Fig. 1

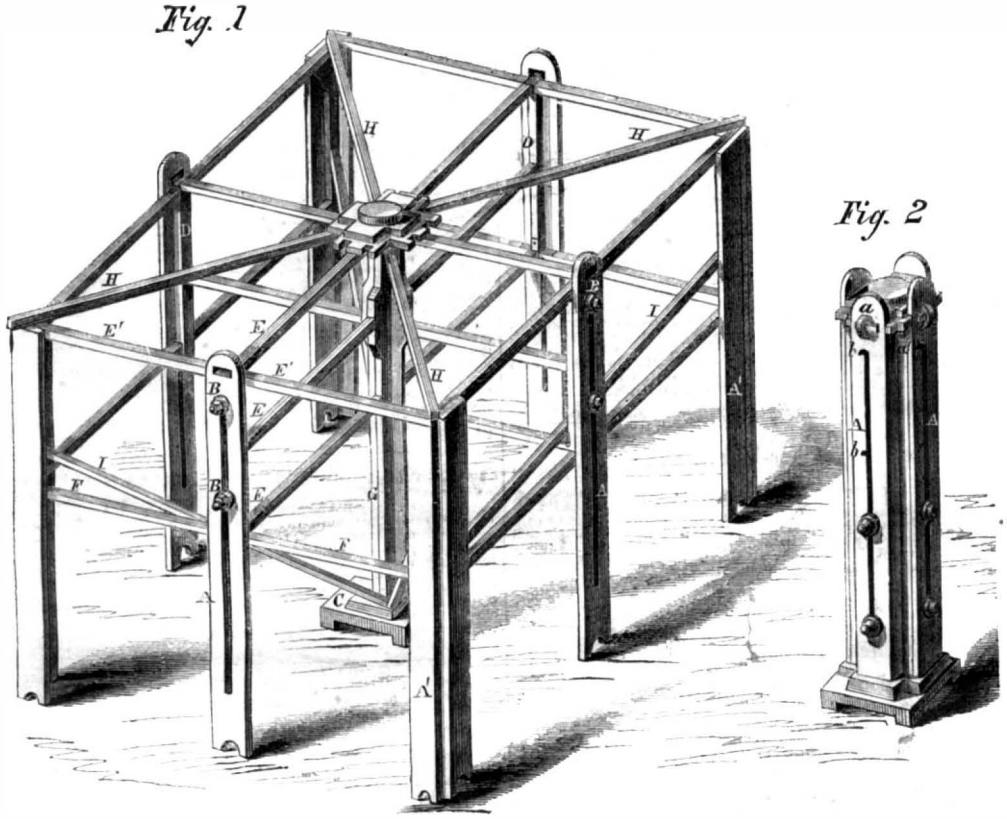

Fig. 2

MAYHUGH'S PATENT CLOTHES FRAME.

Revival of Mosaic Work in Venice.

The beautiful art of producing various designs by inlaying in colored glass, minerals and metals, which had become almost obsolete, has been revived in Venice. A correspondent of the *Boston Advertiser*, writing from that city, states that he has lately visited the mosaic manufactory, which is in an old palace on the banks of the Grand Canal. He states that about two hundred artisans are employed cutting the colored glass, grinding and polishing the pieces and fitting them together, forming most beautiful productions. Groups of the Savior and the Apostles, figures of saints, &c., are produced in exquisite style, for windows of cathedrals. Inlaid tables, caskets and rich vases, mounted in silver and precious stones, are also made. A beautiful mosaic floor is being made for the Viceroy of Egypt, and mosaics for windows in the Queen's chapel at Windsor are being produced from designs drawn by the princess of Prussia.

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